Nutritional Status of Oral Squamous Cell Carcinoma and its Association with Post-operative Wound Dehiscence

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Abstract

Background:
Malnutrition, a subacute or chronic state, were prevalent among oral squamous cell carcinoma (OSCC) patients, may impair immune function, increase susceptibility to infection and increase complications of the treatment, thus leading to an increased mortality of cancer patients

Objective:
To evaluate the nutritional status of patients with oral squamous cell carcinoma and its association with post-operative wound dehiscence.

Methods:
The prospective study involved 60 patients with oral squamous cell carcinoma carried out from 1st January to 31st December 2020 in Oral & Maxillofacial Surgery Department of Bangabandhu Sheikh Mujib Medical University and Dhaka Dental College & Hospital, Dhaka, Bangladesh, divided into 2 groups; Group-I: patients who developed no post-operative complications (n=49) and Group-II: patients who developed post-operative wound dehiscence (n=11).Nutritional assessments were performed on the day prior to operation using four parameters (BMI, percent ideal body weight, serum albumin, total lymphocyte count) classifying the patient's nutritional status into normal nutrition, mild malnutrition, or moderate malnutrition, then the patients were followed up till discharge and post-operative wound dehiscence was recorded. Statistical analysis was performed using SPSS version 23 considering p-value <0.05 as significant.

Results:
Nutritional assessments based on four nutritional indicators revealed that malnutrition was significantly associated with patients who developed post-operative wound dehiscence compared to patients who developed no post-operative complications (Group-I vs Group-II : mean BMI 21.3±2.2 vs 17.1±1.4(p=0.001);mean percent ideal body weight 97.0±11.4 vs 81.6±6.5(p=0.001); meanserum albumin 33.6±4.1vs 26.9±4.2gm/d (p=0.001); meantotal lymphocyte count 2282.6±819.1 vs 1736.0±474.8 mm^3, (p=037).

Conclusion:
Malnutrition is associated with post-operative wound dehiscence in patients with oral squamous cell carcinoma. So, every patients houldassess nutritional status pre-operatively to reduce post-operative complecations.

Keywords: Oral squamous cell carcinoma, Nutritional status, Post-operative wound dehiscence

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Introduction:

Oral squamous cell carcinoma (OSCC) is the most common oral malignancy, representing up to 80-90% of all malignant neoplasms of the oral cavity.[1] OSCC shows geographical variation with respect to the age, sex, site and habits of the population.[2] So the incidence of oral cancers parallels the longevity, multiplicity, and intensity of carcinogenic exposure. It is generally considered that OSCC is most common in men in

the 6th to 8th decades of life and is rare in patients younger than 40 years.[3] Patients with oral squamous cell carcinoma were one of the focused areas of concern for malnutrition. Oral squamous cell carcinoma directly impairs oral intake, and the increasingly intensive treatments magnify the risk for severe malnutrition. Antineoplastic therapy not only contributes to local disease control and survival, but also creates and exacerbates multiple symptoms that further compromise oral intake (i.e. dysphagia, anorexia, mucositis, xerostomia, chemosensory alteration). Oral squamous cell carcinoma patients often require non-volitional feeding.[4-6] International experts have provided conceptual frameworks for the diagnosis of cancer-associated malnutrition and cachexia. These include the oncology nutrition guidelines of the European Association for Enteral and Parenteral Nutrition[4] and several more recent efforts[7] that were motivated by concern that multiple discordant definitions for these terms were employ in the literature. Malnutrition is oftenignoredin treatments and follow-up care.[8] With the growth of cancer cases, the management and care problem soft hese diseases are expected to be minimized; also, through diagnosis and early treatment, better quality of life were expected for the patients.[9] Studies indicate that malnutrition were prevalent among 35 to 50% of oral squamous cell carcinoma patients. Malnutrition as an important factor in the treatment of oral squamous cell carcinoma affects patient's mortality and morbidity. In a study it was shown that about 20% of these patients die with the symptoms which were caused by malnutrition.[8]

The study aimed to assess the nutritional status of patients with oral squamous cell carcinoma and its association with post-operative wound dehiscence.

Methods:

This prospective study was carried out from 1st January 2020 to 31st December 2020 in Oral & Maxillofacial Surgery Department of Bangabandhu Sheikh Mujib Medical University and Dhaka Dental College & Hospital, Dhaka, Bangladesh. Sixty (60) patients with oral squamous cell carcinoma cases were purposively selected, divided into 2 groups; Group-I: patients who developed no post-operative complications (n=49) and Group-II: patients who developed post-operative wound dehiscence (n=11).

Nutritional assessments were performed on the day prior to operation using four parameters (BMI, percent ideal body weight, serum albumin, total lymphocyte count) classifying the patient's nutritional status into normal nutrition, mild malnutrition, or moderate malnutrition, then patients were followed up till discharge and post-operative wound dehiscence was recorded. BMI was defined as body weight in kilograms divided by height in meters square. (i) BMI >18.5-Normal nutrition (ii) BMI 17-18.5- Mild malnutrition (iii) BMI 16-17- Moderate malnutrition (iv) BMI <16-Severe malnutrition.[10] Percent ideal body weight (%IBW) were performed by the equation %IBW=(weight measurement Ч100)/(ideal weight). Normal weight is defined as %IBW 90–110%. Under weight is assumed if %IBW falls below 90% (with 85–89% indicating mild, 75–84% moderate, <75% severe nutritional failure, respectively).[11] Serum albumin levels were measured with the bromcresol-purplemethod. Albumin levels >35g/L normal nutrition, between 27 to 35g/L mild depletion, 21 to 27g/L moderate depletion; and <21 g/L, severe depletion.[12] With regard to nutritional status, a TLC of >1800mm^3 normal nutrition, 1500–1800 mm^3 were considered to reflected mild depletion; 900–1500 mm^3, moderate depletion; and <900 mm^3, severe depletion.[12] Patients were undergone for total maxillectomy/ mandibulectomy under general anaesthesia followed by radiotherapy, chemotherapy or a combination of these as per necessity and maintained on naso-gastric tube feeding post-operatively for 7 days. Swallowing started 8-12 days postoperatively, by drinking water, and gradually extended to a complete diet. All patients were monitored until discharge and postoperative wound dehiscence was recorded. Collected data were classified, edited, coded and entered the computer for statistical analysis by using SPSS version 23.Statistical significance was determined at p values <0.05.

Results:

Out of 60 patients most of the patients with no post-operative complication (n=49; 48,85.7%) had normal BMI whereas only 1 patient with post-operative wound dehiscence (n=11) had normal BMI with 63.6 % had moderate and 27.3% had mild malnutrition. Mean BMI of group-I vs group-II was21.3±2.2 vs17.1±1.4 (p=0.001) (Table-I).

Table-I: Distribution of the patients by BMI status (N=60)

BMI status	Group-I (n=49) no. (%)	Group-II (n=11) no. (%)	p-value
>18.5 (Normal nutrition)	42(85.7)	1(9.1)	
17.1-18.5 (Mild malnutrition)	7(14.3)	3(27.3)	
16-17 (Moderate malnutrition)	0(0)	7(63.6)	
Mean±SD	21.3±2.2	17.1±1.4	0.001s
Range(min-max)	18.2-25.23	14.1-19.9	

s=significant, p value reached from unpaired t-test

Based on percent ideal body weight, most of the patients with no post-operative complication (n=49; 32, 65.3%) had normal nutrition whereas 54.5% (6) patients with post-operative wound dehiscence (n=11) had moderate malnutrition. Mean percent ideal body weight of group-I vs group-II was 97.0±11.4 vs 81.6±6.5, (p=0.001) (Table-II).

Table-II: Distribution of the patients by percent ideal body weight (N=60)

Percent ideal body weight (%)	Group-I (n=49) no. (%)	Group-II (n=11) no. (%)	p-value
≥90 (Normal nutrition)	32(65.3)	2(18.2)	
85–89 (Mild malnutrition)	17(34.7)	3(27.3)	
75–84 (Moderate malnutrition)	0(0.0)	6(54.5)	
Mean±SD	97.0±11.4	81.6±6.5	0.001s
Range (min-max)	81.7-126.19	75.6-93.9	

s=significant, p value reached from unpaired t-test

Based on serum albumin, 25 (51.0%) and 24(49.0%) patients with no post-operative complication had normal nutrition and mild malnutrition respectively whereas 9 (81.8%) patients with post-operative wound dehiscence had moderate malnutrition. Mean serum albumin of group-I vs group-II was 33.6±4.1 vs 26.9±4.2 gm/dl (p=0.001) (Table-III).

Table-III: Distribution of the study patients by serum albumin (N=60)

Serum albumin (gm/dl)	Group-I (n=49) no. (%)	Group-II (n=11) no. (%)	p-value
35 (Normal nutrition)	25(51.0)	1(9.1)	
27-34 (Mild malnutrition)	24(49.0)	1(9.1)	
21-26 (Moderate malnutrition)	0(0.0)	9(81.8)	
Mean±SD	33.6±4.1	26.9±4.2	0.001s
Range(min-max)	27-41.0	22-37.0	

s=significant, p value reached from unpaired t-test

Regarding total lymphocyteount, 32 (65.3%) patients with no post-operative complication had normal nutrition whereas 5 (45.5%) patients with post-operative wound dehiscence had moderate malnutrition. Mean total lymphocyte count of group-I vs group-II was 2282.6±819.1 vs 1736.0±474.8 mm^3 (p=037) (Table-IV).

Table-IV: Distribution of the study patients by total lymphocyte count (N=60)

Total lymphocyte count (mm^3)	Group-I (n=49) no. (%)	Group-II (n=11) no. (%)	p-value
>1800 (Normal nutrition)	32 (65.3)	3 (27.3)	
1500-1799(Mild malnutrition)	15 (30.6)	3 (27.3)	
900-1499 (Moderate malnutrition)	2 (4.1)	5 (45.5)	
Mean±SD	2282.6±819.1	1736.0±474.8	0.037s
Range(min-max)	1020.0-4972.0	1300.0-2711.0	

p-value reached from unpaired t-test

Discussion:

Nutritional impairment is reported frequently in oral cancer patients. In previous studies, a clear relation between nutritional deficit and morbidity had been shown. Most of these studies reported malnutrition to be present in 35% to 50% of all oral cancer patients.[8,13,14] Change in nutritional status is associated with reduced organ function and deterioration of immune status. The presence of a chronic inflammation, as observed in cancer for instance, increases catabolism and greatly alters immune defenses.[15] Various studies have highlighted a correlation between malnutrition and post-operative complications in oral cancer patients, in the specific context of surgery where an altered nutritional status is associated with increased surgical morbidity and mortality. Nutritional assessment is currently recommended, particularly in situations where nutritional deficit is associated with an increased risk of complications. Keeping these points in mind, this study was conducted to assess nutritional status and their relationship to post-operative wound dehiscencein oral squamous cell carcinoma patients to a satisfactory level. Regarding the BMI status of the patients in this study it was found that 42(85.7%) patients had normal nutrition in group-I and 7(63.6%) moderate malnutrition in group-II. The mean BMI was found 21.3±2.2 kg/m^2 in group-Iand 17.1±1.4 kg/m^2 in group-II. The mean BMI was statistically significant (p<0.05) between two groups. Pacelli F et al[16] showed in mal-nutrient

patient the rate of post-operative wound dehiscence was 11.7% and in case of normal nutrition patient, the rate of post-operative wound dehiscence was 9.4%.The mean percent ideal body weight was found 97.0±11.4 percent in group-I, 81.6±6.5 percent in group-II. The mean percent ideal body weight was statistically significant ($p<0.05$) between two groups. Regarding the serum albumin of the patients, mean serum albumin was 33.6±4.1 g/l in group-I, 26.9±4.2 g/l in group-II ($p<0.05$). Jensen et al[5] showed complications related tosurgeries performed on malnourished patients. They found 59% post-operative complications developed on low serum albumin (<30g/L) patients. In this study regarding the total lymphocyte count (TLC) of the patients, it was found that the mean total lymphocyte count was found 1020.0±819.1 mm^3 ingroup-I, 1736.0±474.8 mm^3 in group-II. Nahid Aghdaii et al[17] showed significance of pre-operative TLC as a prognostic criterion in surgery and found that TLC <1500 cells/mm^3 was associated with significantly high morbidity ($p=0.0001$). In hospital wound dehiscence were 28.4% with TLC <1500 cells/mm^3. Jensen et al[5] shown complications related to surgeries performed on malnourished patients. They found 59% post-operative complications developed on TLC< 1000 cells/mm^3. From the current study it has been seen that each of the parameters of nutritional status related to oral squamous cell carcinoma.

Conclusion:

This study may have a major impact on surgical strategies in the future, because pre-operative nutrition might reduce postoperative complications in this patient group. Further studies are needed in future to investigate whether it is possible to counteract the adverse effects of malnutrition on surgery by preoperative nutritional support.

References:

1. Pires FR, Ramos AB, Oliveira JB, Tavares AS, Luz PS, Santos TC. Oral squamous cell carcinoma: clinicopathological features from 346 cases from a single oral pathology service during an 8-year period. J Appl Oral Sci. 2013 Sep-Oct;21(5):460-467. doi: 10.1590/1679-775720130317.
2. Ayesha Z, Nagi AH, Nadia N. A clinicopathological study of orofacial squamous cell carcinoma in local population. Biomedica2013;29:147-150.
3. Rai HC, Ahmed J. Clinicopathological Correlation Study of Oral Squamous Cell Carcinoma in a Local Indian Population. Asian Pac J Cancer Prev. 2016;17(3):1251-1254. doi: 10.7314/apjcp.2016.17.3.1251.
4. van den Berg MG, Rasmussen-Conrad EL, van Nispen L, van Binsbergen JJ, Merkx MA. A prospective study on malnutrition and quality of life in patients with head and neck cancer. Oral Oncol. 2008 Sep;44(9):830-837. doi: 10.1016/j.oraloncology.2007.11.002.
5. Oates JE, Clark JR, Read J, Reeves N, Gao K, Jackson M,et al. Prospective evaluation of quality of life and nutrition before and after treatment for nasopharyngeal carcinoma. Arch Otolaryngol Head Neck Surg. 2007 Jun;133(6):533-540. doi: 10.1001/archotol.133.6.533.
6. Jager-Wittenaar H, Dijkstra PU, Vissink A, van der Laan BF, van Oort RP, Roodenburg JL. Critical weight loss in head and neck cancer-prevalence and risk factors at diagnosis: an explorative study. Support Care Cancer. 2007 Sep;15(9):1045-1050. doi: 10.1007/s00520-006-0212-9.
7. Arends J, Bodoky G, Bozzetti F, Fearon K, Muscaritoli M, Selga G, et al;German Society for Nutritional Medicine;European Society for Parenteral and Enteral Nutrition). ESPEN Guidelines on Enteral Nutrition: Non-surgical oncology. Clin Nutr. 2006 Apr;25(2):245-259. doi: 10.1016/j.clnu.2006.01.020.
8. Jensen GL, Mirtallo J, Compher C, Dhaliwal R, Forbes A, Grijalba RF,et al; International Consensus Guideline Committee. Adult starvation and disease-related malnutrition: a proposal for etiology-based diagnosis in the clinical practice setting from the International Consensus Guideline Committee. JPEN J Parenter Enteral Nutr. 2010 Mar-Apr; 34(2): 156-159. doi: 10.1177/ 0148607110361910.
9. Leuenberger M, Kurmann S, Stanga Z. Nutritional screening tools in daily clinical practice: the focus on cancer. Support Care Cancer. 2010 May;18 Suppl 2:S17-27. doi: 10.1007/s00520-009-0805-1.
10. Managing Adult Malnutrition in the Community. British Dietetic Association. 3rd Edition: 2021
11. Borowitz D, Baker RD, Stallings V. Consensus report on nutrition for pediatric patients with

cystic fibrosis. J Pediatr Gastroenterol Nutr. 2002 Sep;35(3):246-59. doi: 10.1097/00005176-200209000-00004.
12. Gottschlich MM, Matarese LE, Shronts EP. Nutrition Support Dietetics Core Curriculum. 2nd Edition.Silver Spring, Aspen.1993.
13. Hussain M, Kish JA, Crane L, Uwayda A, Cummings G, Ensley JF, et al.The role of infection in the morbidity and mortality of patients with head and neck cancer undergoing multimodality therapy. Cancer. 1991 Feb 1;67(3):716-721. doi: 10.1002/1097-0142(19910201)67:3<716:aid-cncr2820670331>3.0.co;2-j.
14. Westin T, Ahlbom E, Johansson E, Sandstrцm B, Karlberg I, Edstrum S. Circulating levels of selenium and zinc in relation to nutritional status in patients with head and neck cancer. Arch Otolaryngol Head Neck Surg. 1989 Sep;115(9):1079-82. doi: 10.1001/archotol.1989.01860330069019.
15. Bhuiyan AKMMU, Kabir MJ, Rahman MM. Nutritional indicators for postoperative morbidity in elective oncological surgery. Journal of surgical science 2012; 16(1):3- 10.
16. Pacelli F, Bossola M, Rosa F, Tortorelli AP, Papa V, Doglietto GB. Is malnutrition still a risk factor of postoperative complications in gastric cancer surgery? Clin Nutr. 2008 Jun;27(3):398-407. doi: 10.1016/j.clnu.2008.03.002.
17. Aghdaii N, Ferasatkish R, Mohammadzadeh Jouryabi A, Hamidi SH. Significance of preoperative total lymphocyte count as a prognostic criterion in adult cardiac surgery. Anesth Pain Med. 2014 Jun 23;4(3):e20331. doi: 10.5812/aapm.20331.