Original Research Article

# Assessment of Nutritional Status of Locally Advanced Head and Neck Carcinoma Patients Treated With Concomitant Chemo-radiation, by using Scored Patient-Generated Subjective Global Assessment (PG-SGA)

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**Abstract**

**Background:** *The aim of present study was to assessed the nutritional status of locally advanced head and neck carcinoma patients (LAHNC) treated with concomitant chemo-radiation by using Scored Patient-Generated Subjective Global Assessment (PG-SGA) and correlated the nutritional status with local control of disease and side effect of treatment.*

**Methods:** *The present study was conducted on 60 previously untreated, histopathologically proven patients of locally advanced head and neck carcinoma who received conventional radical external beam radiation therapy (66Gy / 33 fractions over 6.3 weeks / 2 Gy per fraction) concomitant with Inj. Cisplatin 75mg/m$^2$, 3 weekly. Nutritional status of patients was performed at time of presentation, at the end of treatment and three months after completion of treatment by using Scored Patient-Generated Subjective global assessment*

**Result:** *Approximately 55% patients had moderate malnutrition (Stage-B) before start of treatment. Then at end of treatment, 56.67% patients were moderately malnourished (stage-B) and 41.67% were severely malnourished (stage-C). At 3$^{rd}$ month of follow up, 50% were moderate malnourished (Stage-B) and 13.33% were severe malnourished (Stage-C). Grade 3 acute skin radiation toxicity was observed in 25% of well nourished patients (stage A) and 41.94% of stage B patients. Grade 3 acute mucosal radiation toxicity was observed in 39.29% patients of stage A and 31% patients of stage B. No evidence of disease was seen in 96.43% patients of Stage-A and 65.62% patients of Stage- B at third month of follow up. The difference between stage-A and B was statistically significant, p value 0.003.*

**Conclusion**: *The current study concludes that prevalence of malnutrition increases shortly after concomitant chemo-radiation in locally advanced head and neck cancer patients. Subsequently, prevalence of malnutrition substantially decreases during the first three months after treatment.*

**Keywords:** *cancer, head and neck, concomitant chemo-radiation, scored patient-generated subjective global assessment, nutrition assessment.*

## Introduction

At time of diagnosis, approximately 35% to 60% of all patients with head and neck cancer are malnourished[1]. This malnutrition will be extended to 44-88% due to concomitant chemo-radiation[2]. Prevalence of malnutrition was significantly higher

during first three months after treatment in compare to malnutrition before start of treatment then gradually decline in the periods >3-12 months [3]. Malnutrition greatly affects treatment outcome in cancer outcome so it has become essential to take nutritional status into account in the patient's management[4]. Nutrition status of cancer patients can be assesses by objective and subjective methods. The use of objective nutrition methods (anthropometric [BMI], biochemical and immunological) to assess nutritional status has been questioned in view of the many non-nutritional factors affecting the results and these difficulties has been overcome by use of subjective methods (PG-SGA) of assessment of nutritional status. The ideal nutrition assessment tool would be 100% specific and sensitive. The PG-SGA method had a sensitivity of 98% and a specificity of 82% so that scored PG-SGA has been accepted as the standard for nutrition assessment for patients with cancer[5].

The present study was planned to assessed the nutritional status of locally advanced head and neck carcinoma patients (LAHNC) treated with concomitant chemo-radiation by using Scored Patient-Generated Subjective Global Assessment (PG-SGA) and correlated the nutritional status with local control of disease and side effect of treatment.

## Material and Methods

The study was conducted on 60 previously untreated, histopathologically proven patients of squamous cell carcinoma of head and neck. The patients was staged according to American Joint Committee on Cancer 2010 staging system. Sixty patients of locally advanced head and neck carcinoma, received conventional radical external beam radiation therapy (66 Gy / 33 fractions over 6.3 weeks / 2 Gy per fraction) concomitant with Inj. Cisplatin 75mg/m$^2$, 3 weekly, were assessed for nutritional status at time of presentation, at the end of treatment and three months after completion of treatment. The nutritional status of patients were performed by using Scored Patient-Generated Subjective global assessment (PG-SGA). The

response of the tumor was assessed based on WHO criteria and the radiation reactions were graded according to the RTOG (Radiation Therapy Oncology Group) criteria.

The Scored PG-SGA tool had seven questionnaires. First four was completed by patient him/herself or assisted as per information provided by the patient. These included weight changes, food intake, symptoms, activity and function. Questionnaire 5, 6 and 7 included diseases and its relation to nutritional requirements, metabolic demand and physical examination was completed by clinical examiner. A numerical score was determined by using parenthetical points. These scores were applied in Global assessment of patient's nutritional status by assigning a global rating Stage A (well nourished), Stage B (moderately malnourished) or Stage C (severely malnourished).

## Statistical analysis

Data was entered in Microsoft excel spread sheet and checked for errors. Data was analysed using SPSS for Windows version 16.0. Z-test for proportions was used to evaluate difference in 2 proportions. Chi-square test was used to see association of qualitative data. Point of statistical significance was taken when p<0.05.

## Results

### Patient's characteristics

In this study most of the patients were males (95%), approximately 68.33% of the patients were in the age group of 41-60 years who were mainly from the rural areas (85%) and most of them were smokers (96.67%) and alcoholics (73.33%).
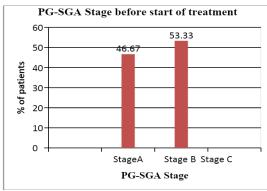
Most of the patients were presented with chief complaints of pain throat and difficulty in swallowing. Ulcero-proliferative growth was more common (86.67%) and histo-pathologically proven moderately differentiated squamous cell carcinomas (95%) was the most common histology. Oropharynx (66.67%) including base of tongue, tonsils, soft palate was the most common site in all patients with majority of patients having

T3 tumour status (88.33%).Sixty five percent of patients have stage III disease.

**Nutritional status by Patient Generated Subjective Global Assessment (PG-SGA) method before start of treatment**

The pre treatment PGSGA of all 60 patients is shown in Figure - 1 and assessed according to PG-SGA stage, 28(46.67%) were well nourished (Stage-A) and 32(53.33%) were Moderate malnutrition (Stage-B) before start of treatment.
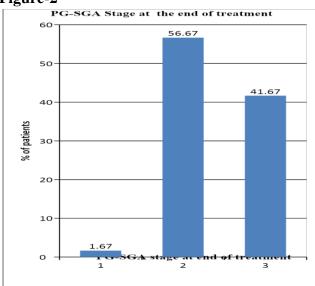
**Figure--1**



**Nutritional status by Patient Generated Subjective Global Assessment (PG-SGA) method at end of treatment**

The nutritional status by PGSGA of all 60 patients is shown in figure-2. According to PG-SGA stage system 1(1.66%) patient was well nourished (Stage-A), 34(56.67%) patients were Moderate malnutrition (Stage-B) and 25(41.67%) patients were Severe malnutrition (Stage-C) at end of treatment.
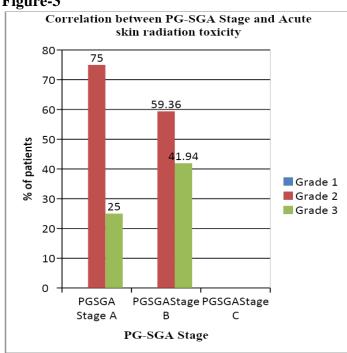
**Figure-2**



**Correlation between PGSGA stage and Acute skin radiation toxicity**

Figure-3 show correlation between PGSGA stage with acute skin radiation toxicity noted during 6th week of treatment. Grade 2 skin toxicity was observed in 75% of PGSGA stage A patients and 59.36% of PGSGA stage B patients. Grade 3 skin toxicity was observed in 25% of PGSGA stage A patients and 41.94% of PGSGA stage B patients. The difference was not statistically significant (p value-0.2)
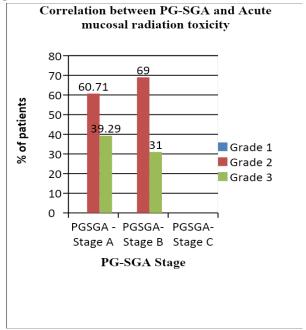
**Figure-3**



**Correlation between PGSGA stage and acute mucosal radiation toxicity**

Figure-4 show correlation between PGSGA stage with acute mucosal radiation toxicity noted during 6th week of treatment. Grade 2 mucosal toxicity was observed in 60.71% patients of PGSGA stage A and 69% patients of PGSGA stage B. Grade 3mucosal toxicity was observed in 39.29% patients of PG-SGA Stage A and 31% patients of PG-SGA Stage B. The difference was not statistically significant (p value-0.515).
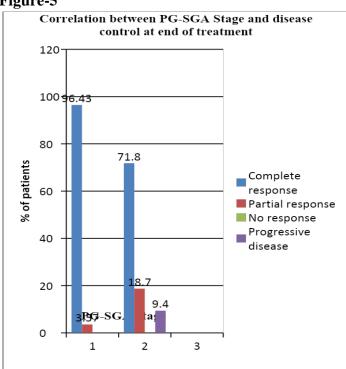
**Figure-4**



Figure-4: Correlation between PG-SGA and Acute mucosal radiation toxicity

**Correlation between PGSGA stage and disease control at the end of treatment**
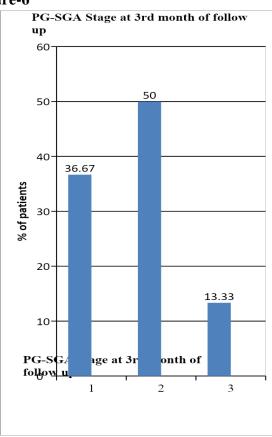
Figure-5 show correlation between PGSGA stage with local control of disease at the end of treatment. Complete response was seen in 96.43% patients of PGSGA Stage – A and 71.8% patients of PGSGA Stage – B. (The difference between PGSGA stage A and B is statistically significant, P value 0.011).

**Figure-5**



Figure-5: Correlation between PG–SGA Stage and disease control at end of treatment

**Nutritional status by Patient Generated Subjective Global Assessment (PG-SGA) method at 3rd month of follow up**

The pre treatment PGSGA stage of all 60 patients shown in figure-6 and according to PG-SGA staging system, 22(36.67%) patients were well nourished (Stage-A), 30(50%) patients were moderate malnutrition (Stage-B) and 8(13.33%) patients were Severe malnutrition (Stage-C) at 3rd month of follow up after treatment.
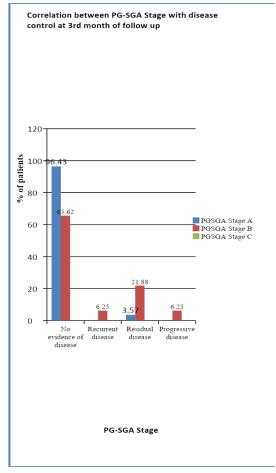
**Figure-6**



Figure-6: PG-SGA Stage at 3rd month of follow up

**Correlation between PGSGA stage and disease control at 3 rd month of follow up**

Figure-7 show correlation between PGSGA stage with local control of disease at 3rd month of follow. No evidence of disease was seen in 96.43% patients of PGSGA Stage – A and 65.62% patients of PGSGA Stage – B. The difference between PGSGA stage A and B is statistically significant, P value 0.003.

**Figure-7**



Correlation between PG-SGA Stage with disease control at 3rd month of follow up

## Discussion

### Pre treatment nutritional status by PG-SGA method

According to PG-SGA stage, 46.67% were well nourished Stage-A and 53.33% were with Moderate malnutrition (Stage-B) and before start of treatment.

Alshadwi et al in their study observed that approximately 35% to 60% of all patients with head and neck cancer are malnourished at the time of their diagnosis[1].

Ravasco et al in their study reported that prevalence of malnutrition in 56% of head and neck cancer patients with stage III and IV, who were planned for concomitant chemoradiation[6].

### Nutritional status by PG-SGA method at the end of treatment

According to PG-SGA stage system, approximately fifty three percent patients had moderate malnutrition (stage B) before treatment. This increased to 56.67% for stage B malnutrition

and 41.67% for stage C malnutrition at the end of treatment.

Jager-Wittenaar observed in their study that during and after treatment, malnutrition may increased[3].

Similar results have been observed by Mittal et al. They reported that 97% of patients had moderate or severe malnourishment on the last day of treatment[7].

### Correlation between PGSGA Stage and acute skin radiation toxicity

Grade 3 skin toxicity was observed in 25% patients of PGSGA stage A and 41.94% patients of PGSGA stage B. The difference was not statistically significant.

### Correlation between PGSGA Stage and mucosal radiation toxicity

Grade 3 mucosal toxicity was observed in 39.29% patients of PGSGA stage A and 31% patients of PGSGA stage B. The difference was not statistically significant.

Bossola et al in their study observed that chemo-radiotherapy (CRT) causes or exacerbates mucositis with consequent worsening of malnutrition in head and neck cancer[8].

Bahl et al in their study observed that Grade 3-4 mucositis was seen in seven patients (21.8%) with PGSGA <9 compared to 55.5% in those with PG-SGA score = 9 (p=0.01)[9].

Paccagnella et al in their study they found that 39.4% of grade 3 to 4 mucositis in 84.8% moderate malnourished (PGSAG Stage B) head and neck cancer patients at end of concomitant chemoradiation[10]

### Correlation between PG-SGA and disease control at the end of treatment

Complete response was seen in 96.43% patients of PGSGA Stage A and 71.8% patients of PGSGA Stage B. The difference between PGSGA stage A and stage B was statististically significant (p value 0.009).

Bahl et al reported in their study that at the time of evaluation a complete response was seen in 16 patients (32%) with a PG-SGA score <9 compared to 4 patients (8%) with a PGSGA =9 (p=0.05)[9].

### Nutritional status by PG-SGA method at 3rd month of follow up

According to PG-SGA staging system, 36.67% were well nourished (Stage-A), 50% were moderate malnutrition (Stage-B) and 13.33% were Severe malnutrition (Stage-C).

Similar trend was observed by Jager-Wittenaar et al, Van den et al and Isenring et at[3,11,12]

Isenring et al in their study reported that forty eight percent of the patients were malnourished 3rd months after radiotherapy[12].

### Correlation between PG-SGA Stage and disease control at 3rd month of follow up

No evidence of disease was seen in 96.43% patients of PGSGA Stage-A and 65.62% patients of PGSGA Stage –B. The difference between PGSGA stage A and stage B was statistically significant (p value 0.002).

### Conclusion

The current study concludes that prevalence of malnutrition increases shortly after concomitant chemo-radiation in locally advanced head and neck cancer patients. Subsequently, prevalence of malnutrition substantially decreases during the first three months after treatment. So, it is recommended that to add nutritional supplement to improve the nutrition status of patients before starting of treatment but more studies needed to support our recommendation.

### Acknowledgement

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