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Nutritional Assessment of Geriatric Cancer Patients with Esophagus and Head and Neck Cancer (HNC)

Research Article

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Abstract

Background: The oesophageal and HNC patients suffer from dysphagia and frequently present with undernourishment. The treatment related toxicities are higher and survival outcomes are poorer in undernourished patients. The geriatric cancer patients (age ≥ 65 years) encounter a unique challenge of age-related undernourishment, which further gets aggravated due to disease biology. There are very few studies from western Indian population to evaluated baseline malnourishment in geriatric cancer patients and its association with treatment outcome.

Objectives: To assess baseline nutritional status and its association with demographic, clinic-pathological and treatment outcome parameters in geriatric cancer patients undergoing chemotherapy treatment.

Materials and Methods: This observational study was conducted at M.S. Patel Cancer Center, Shreekrishna Hospital, Bhaikaka Univeristy, Karamsad, Gujarat, India. The Geriatric cancer patients diagnosed with HNN and esophageal cancer, being treated with curative intent chemotherapy were enrolled in the study from April 2021 to March 2023. Total 89 patients were included in this study. Baseline clinic-pathological data including geriatric assessment was noted. Based on body mass index (BMI) patients were dichotomized in to BMI < 18.5 i.e. undernourished and ≥18.5. An assessment of treatment outcomes including survival as per nutrition status was done.

Results: Out of total 89 patients, 78.7% were males, 95.5% patients were from middle and lower SES, 84.26% patients had HNC and 15.74% esophageal cancer. Patients with metastatic disease were not included in this study. At baseline presentation, as per BMI 33.7% patients were malnourished. On geriatric assessment, malnourishment (BMI < 18.5) was associated with presence of co-morbidity (p value <0.05). Patients with malnutrition required chemotherapy protocol modification and dose reduction (p value <0.05). Treatment completion rate for Chemotherapy and radiation therapy was inferior in malnourished geriatric patients. Primary progression while on treatment was noted in 10 patients with BMI < 18.5 and in 9 patients with BMI ≥ 18.5 (p value - 0.04). Although HR QOL global mean score and Overall survival were inferior in malnourished patients, it was statistically not significant.

Conclusion: A significant proportion of geriatric cancer patients with esophagus and HNC suffer from malnourishment. It adversely affects treatment completion rate and progression free survival in this group of patients. A timely nutritional assessment and dietary interventions should be an integral part of geriatric cancer patient management..

Keywords: Geriatric; Cancer; Malnutrition; BMI; Chemotherapy; Adverse Drug Reaction

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Introduction

Malnourishment has been described as a "deficiency, excess or imbalance of a wide range of nutrients, resulting in a measurable adverse effect on body composition, function and clinical outcome." [1] Malnutrition in cancer patients occurs due to disease biology and treatment side effect, which can be described as anorexia and cachexia. Cancer cachexia manifests as a significant reduction in adult body weight, accompanied by changes in body composition and disturbances in the balance of the biological system. It causes progressive dysfunction, systemic inflammatory response, negative protein-energy balance, and involuntary loss of lean body mass, with or without a decline in adipose tissue. [2] Cachexia is considered as a major contributor to morbidity, to impaired QOL, increase in healthcare costs and accounts for 20% of all cancer-related deaths. [3] Patients with HNC and oesophageal cancer are at greatest risk of cachexia and malnutrition due to direct involvement of anatomical structure involved in food deglutition. [4] In HNC patients mechanical swallowing/chewing difficulties (dysphagia/odynophagia), pain, taste alterations and xerostomia also attribute to low oral intake and weight loss before and during treatment. [5]

In Geriatric age group patients (age ≥65 years), physiological sarcopenia i.e. muscle wasting and weakness can further worsen the deficits associated with cancer cachexia. Malnutrition is an important part of multifactorial geriatric syndrome, yet it is often under-recognised. Other than advanced age and cancer stage, frailty, dementia, major depression, functional impairment, and physical performance are important risk factors for malnourishment. [6] Several screening and assessment tools are used for nutritional assessment in geriatric cancer patients including the BMI, Mini Nutrition Assessment (MNA), the Malnutrition Universal Screening Tool (MUST), and the Patient-Generated Subjective Global Assessment (PG-SGA).[7] The International Society for Geriatric Oncology (SIOG) has recommended "the inclusion of nutritional assessment before the start of active cancer treatment for older adults, after taking consideration of the deleterious impact of malnutrition on older adults with cancer."[8] There are very few studies of nutritional assessment and its impact of treatment outcome in geriatric cancer patients from Western Indian population.

This study was conducted to analyses the prevalence of malnutrition in our geriatric cancer patient population with HNC and oesophageal Cancer, and its association with baseline geriatric assessment parameters and treatment outcomes.

Methodology

This study was a part of a PhD study dealing with the chemotherapy ADRs in Geriatric cancer patients treated with curative intent. This prospective, observational study, was conducted at M.S.Patel Cancer Centre, Bhaikaka University, Karamsad, Gujarat. Study was approved by IEC – April 2021. Patients were enrolled from April 2021 till March 2023. The study was conducted according to ethical guidelines established by the Declaration of Helsinki, Good Clinical Practice Guidelines, and the Indian Council of Medical Research guidelines. Since this not an interventional clinical trial, it was not registered with the Clinical Trials Registry India. Written informed consent was taken from all the participants before enrolment in the study. Baseline assessment included Age, Gender, socio-economic strata (SES) (Modified Kuppuswamy socioeconomic scale), presenting symptom and its duration, Eastern Cooperative Oncology Group Performance status (ECOG PS), Geriatric assessment, Clinical examination, Investigations (Laboratory and Radiological). Details of final diagnosis, planned surgery, radiation therapy and chemotherapy were noted. Any change in chemotherapy dosing, schedule, and protocol selection in view of assessment at baseline were recorded. Adverse drug reactions (ADRs) assessment was done using Common Terminology Criteria for Adverse Events version 5.0 (CTCAE v5.0). Follow-up was planned up to one year post chemotherapy. The overall survival (OS) was calculated from the date of diagnosis until the time of death or last follow-up, while the Relapse-free survival (RFS) was calculated from the time of diagnosis until recurrence, primary progression, or death.

Table 1: Baseline demographic and clinical parameter

Parameter	Category	No. of Patients	Percent (%)
Age	< 70	52	58.4
	70 - 75	27	30.3
	>75	10	11.2
Gender	Male	70	78.7
	Female	19	21.3
SES	Upper	4	4.5
	Middle	48	53.9
	Lower	37	41.6
Site	Esophagus	14	15.7
	Head and neck cancer	75	84.3
CCI	≤2	50	56.2
	>2	39	43.8
BMI	≥18.5	59	66.3
	<18.5	30	33.7
ECOGPS	1	22	24.7
	2	67	75.3
Hb	≤12	43	48.3
	>12	46	51.7
Creatinine clearance	≤60	53	59.6
	>60	36	40.4

Majority of these patients were advised Tri modality treatment (Surgery, radiation and chemotherapy). Most common chemotherapy drugs were platinum (Cisplatin and carboplatin) and Taxanes (Paclitaxel and docetaxel). All the study participants received chemotherapy with curative intent.

Statistical analysis: All quantitative variables are expressed in terms of Mean ± SD subject to variable follows normal distribution or Median (IQR) if variable is non-normal. All qualitative variables are expressed in terms of frequency and percentage. Chi-square test is used to test association between categorical outcomes. Appropriate independent sample t-tests and ANOVA are used to test significance of quantitative study variables with assumption outcome variable having two categories and more than two categories respectively. All above analysis was done using Excel and IBM SPSS version 25.0. The p-value less than 0.05 considered to be significant. To identify factors influencing binary outcome variable we applied logistic regression and Odds ratio (95% CI) and p-value is reported.

Results

Out of total 89 patients, 78.7% were males and majority of

Citation: Srivastava P. Nutritional Assessment of Geriatric Cancer Patients with Esophagus and Head and Neck Cancer (HNC). Indian J Nutri. 2026;13(1): 337.

Table 2: Geriatric assessment parameters and BMI

Parameter	Category	BMI		p-value
		<18.50	≥18.50	
CCI	2	23	27	0.005
	>2	7	32	
TUG	≤20	21	51	0.062
	>20	9	8	
GDS Total	≤ 5	18	36	0.926
	>5	12	23	
Polypharmacy	Yes	5	21	0.063
	No	25	38	
ECOGPS	1	6	16	0.462
	2	24	43	

(CCI – Charlson comorbidity index, TUG – Timed up and go, GDS – Global depression Scale, MOS SSS - Medical Outcomes Study–Social Support Survey, Polypharmacy – daily intake of ≥5 prescription drugs, ECOG PS – Eastern cooperative oncology group performance status)

On geriatric assessment, undernourishment (BMI < 18.5) was associated with presence of co-morbidity. The mean value of Global HRQoL score was not statistically different in undernourished patients.

Table 3: HR QoL and BMI

HRQoL						
Parameter	Category	N	Mean	SD	SE Mean	p-value
BMI	< 18.50	30	72.86	12.24	2.23	0.103
	≥18.50	59	77.54	12.90	1.68	

Table 4: Treatment received

Parameter	Category	No. of Patients	Percent (%)
Surgery done	Yes	29	32.6
	Not advised	58	65.2
	Unfit	1	1.1
	Decline	1	1.1
Radiation therapy Received	Yes	68	76.4
	Not advised	3	3.4
	Unfit	7	7.9
	Decline	11	12.4
Chemotherapy protocol	NACT CP	36	40.4
	Concurrent CP weekly	13	14.6
	Concurrent Cisplatin weekly	45	50.5
	Concurrent Carboplatin weekly	25	28.0
	NACT Gemcitabine+Cisplatin	1	1.1

(NACT – Neoadjuvant chemotherapy, CP – Carboplatin+Paclitaxel)

Patients with undernutrition required chemotherapy drug change and dose reduction. (p value <0.05). Also, treatment completion rate as per plan, both for Chemotherapy and radiation therapy was inferior in undernourished geriatric patients.

these patients were from middle and lower SES (95.5%). Seventy-five patients had HNC and 14 patients had oesophagus primary. Metastatic disease patients were excluded from the study. Additional comorbidities were present in 43.8% patients. Twenty five percent patients had ECOG PS 1 and 75 % had ECOG PS 2. The formula for calculation of BMI as follows, BMI = weight (kg)/height^2 (m). A BMI of < 18.5 is considered under nourished.[9]

Discussion

Malnutrition in geriatric population and specially with

Table 5: Treatment outcomes and malnutrition (BMI < 18.5)

Parameter	Category	BMI		p-value
		<18.50 (N-30)	≥18.50 (N-59)	
Chemo Modification Required	No	19	23	0.030
	Yes	11	36	
RT Completed	Yes	15	38	0.051
	No	3	11	
Chemotherapy Cycles Completed	No	21	27	0.030
	Yes	9	32	
Dose Reduction	No	23	26	0.003
	Yes	7	33	
Dose Delay	No	24	38	0.130
	Yes	6	21	
CTCAE Max	Mild	17	38	0.416
	Moderate	13	20	
Primary Progression	No	20	50	0.049
	Yes	10	9	
Disease Free	No	20	42	0.970
	Yes	7	15	

Primary progression while on treatment was noted in 10 patients with BMI < 18.5 and in 9 patients with BMI ≥ 18.5 (p value 0.04). Although Overall survival was inferior in undernourished patients, it was statistically not significant. Hazard Ratio 1.363 [95% CI (0.725 – 2.566); p-value = 0.336.

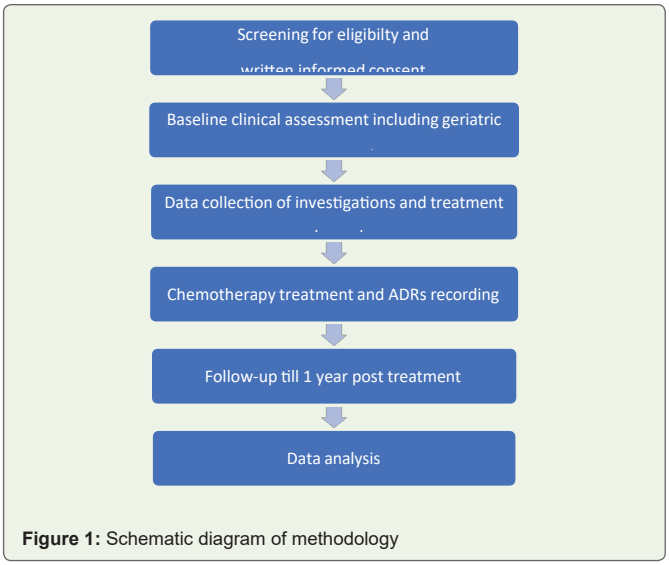

Figure 1: Schematic diagram of methodology

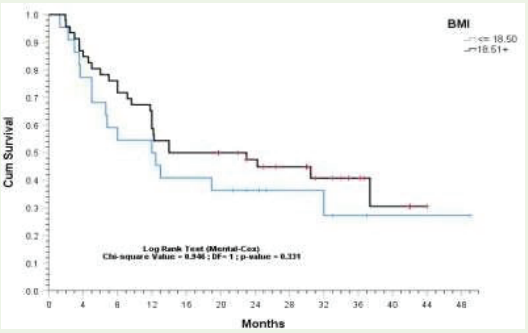

Figure 2: BMI and survival

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esophageal and HNC cancer patients is multifactorial, some of which are correctable with timely diagnosis and intervention. The present study highlights the need of comprehensive geriatric assessment including nutrition in patients with HNN and oesophageal cancer. In this group of patient's malnutrition is multifactorial and adversely affects treatment outcome. Timely identification of malnourishment and early intervention is the key to prevent poor outcomes from chemotherapy and the disease itself. BMI is an easy nutritional assessment tool, that includes height and weight of patient. Globally BMI < 18.5 is considered as undernourished. [1] As per BMI scale 33.7% of the patients were undernourished in this study.

The MNA was originally developed to identify patients 65 years or older at risk of malnutrition irrespective of a specific disease. Both versions, the short-form and long-form, are recommended for screening of nutritional status of older patients. In MNA short form screening maximum score is 14. Scores ≥12 indicate satisfactory nutritional status, with no further requirement. A screening score ≤ 11 suggests risk for malnutrition.[11] In a study conducted by Rubenstein et al, the MNA short form had 97.9% sensitivity, 100% specificity and 98.7% diagnostic accuracy for predicting undernutrition.[12] The MNA takes recent weight loss, loss of appetite, mobility, and neuro-psychological parameters in to account as well unlike BMI which is a one-time assessment. Many studies have evaluated MNA and other nutritional assessment tools and highlighted need for more comprehensive assessment including serum albumin, hemoglobulin and skeletal muscle mass as an appropriate tool. [13, 14]. In an Indian study conducted by Noronha et al revealed that 75% of patients had abnormal MNA scores. [15]

Malnutrition has been associated with cognitive decline and frailty. A systemic review of 6 longitudinal studies evaluating risk factors for malnutrition in the older population highlights significance of cognitive decline (OR: 1.844; P = 0.001), dementia (OR: 2.139; P = 0.001). [3] In our study, comprehensive geriatric assessment suggests that undernourishment was associated with higher CCI.

In a systematic review of nutrition as potential prognostic factor for health and treatment outcomes in patients with cancer, 23 out of 56 studies merged patients with malnutrition and at risk of malnutrition as MNA scores, and reported 27.0–85.0% being at least at risk. In a chemotherapy prediction model validated by Hurria et al mini-nutritional assessment was an important predictor of grade 3 and 4 nonhematologic toxicity. [4] In our study also study malnutrition predicted mortality/survival, cancer progression, treatment maintenance and (health-related) quality of life and did not predict adverse treatment outcomes and functional status/ decline in patients with cancer. In our patient population more patients with undernutrition required chemotherapy drug change and dose reduction. (p value<0.05). Primary progression while on treatment was noted in 10 patients with BMI < 18.5 and in 9 patients with BMI ≥ 18.5 (p value 0.04). In older age patients' cancer cachexia is a key predictor of mortality. [5] In our study although Overall survival was inferior in undernourished patients, it was statistically not significant.

There are few limitations of our study. It was conducted at a single centre, only esophageal and HNC patients were included in this study. Metastatic disease patients were excluded. Most of the patients were from middle and lower socioeconomic status. These factors may affect nutrition status and treatment outcome. it will be difficult to extrapolate the result in patients form upper SES who have better access to supportive health care and to patients diagnosed with other sites of malignancy. This is an observational study so impact of dietary intervention could not be commented upon.

Conclusion

Our study highlights the high prevalence of malnutrition in this group of patient population. Malnutrition is associated with frailty, poor PS, cognition, and functional decline. It adversely affects clinical outcome in cancer patients. Incorporating CGA in every geriatric oncology patient and early dietary intervention are unmet need of hour.

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