

ORIGINAL ARTICLE

Assessment of malnutrition in cancer patients

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ABSTRACT:

Background: Risk of malnutrition is high in cancer patients being treated with chemotherapy. Hence nutritional assessment at initial stage is essential to maintain overall weight of patients and improve clinical outcomes. **Objectives:** To evaluate nutritional wasting in cancerous patients. **Materials and methods:** In this study we recruited 200 cancer patients who were evaluated for nutritional insufficiency. The parameters analysed were BMI, MAC, TSF, MMAC, serum albumin and haemoglobin. The data generated were analysed with paired t-test. **Result:** We found significantly low anthropometric variables as well as biochemical variables in cancer patients when compared before initiation of chemotherapy and after 3 complete rounds of chemotherapy. **Conclusion:** Assessment of malnutrition in cancer patients reduces comorbidities and improves the life standard of such patients. **Keyword:** Cancer, Nutrition, wasting syndrome

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INTRODUCTION

Cancer is associated with cytokine storm, metabolic and clinical factors that results in wasting syndrome [1]. Such syndrome when present affects 50% of patients at diagnostic stage and 80% of patients at advanced stage [2].

Most of the cancers require multifaceted management along with chemotherapy, radiotherapy and surgery [3]. Chemotherapeutic treatment is often associated with side effects, common being nausea, vomiting, diarrhea, constipation, oral mucositis, xerostomia, foot aversions etc. All these factors alter the energy homeostasis leading to lean body mass [4]. Wasting syndrome in cancer patients increases their susceptibility to infections and comorbidities thereby increasing the health care expenses [5,6,7] that affects overall quality of life [8]. In simple terms quality of life means the outcome that determines individual's inherent personality with respect to factors such as disease and their treatment.

Nutritional status is one of the chief contributors to patient health outcomes during chemotherapy; hence the assessment of nutritional status in cancer patients during the course of treatment helps in overcoming the hazards due to malnutrition. Therefore, it is required to have knowledge of alterations in nutritional status caused either by cancer or its treatment, so that wasting disease observed in these patients can be managed better with favorable clinical outcomes. Thus in this

study we aimed to evaluate nutritional status of cancer patients undergoing chemotherapy.

Independently of treatment, weight loss greater than 15% in a cancer patient is constantly associated with a poorer prognosis. Malnutrition alone is the cause of death in 5 to 25% of patients [9]. Weight loss can be either progressive or sudden and the approach to nutritional management must be adapted accordingly [10]. While multidisciplinary consensus conferences, diagnosis disclosure consultations and personalized treatment programmes are becoming increasingly widespread, assessment of malnutrition in oncology units is often neglected, in appropriate, or performed too late. However, many patients with head and neck cancer, most of whom have a history of smoking and alcohol abuse, are derived from lower socioeconomic categories, which do not facilitate their management.

Fundamental to tackling the malnutrition problem is to detect it. Nutritional screening should provide the opportunity to identify malnutrition or individuals at high nutritional risk at an early stage of medical care in a non-invasive, inexpensive and feasible way. Routine screening of patients to identify risk of malnutrition has been recommended by many national, international and specialist organizations [11,12].

The lungs, colon and breasts are leading sites of cancer in westernized countries [13]. These cancers are commonly treated with chemotherapy, which often has adverse effect on the nutritional status of the affected patient. More knowledge is needed about the nutritional

status and diet of patients in chemotherapy for lung, colon and breast cancer.

MATERIALS AND METHODS

This prospective study was conducted at Department of Medical oncology, National Institute of Medical Science & Research, Jaipur Rajasthan. From August 2013 to April 2015 in total 200 patients were included. These patients had cancers of breast, cervix, colon, head and neck. The patients were evaluated before the start of chemotherapy and followed upto 4 weeks after till 3 rounds of chemotherapy. Only those patients satisfying inclusion criteria were enrolled and record of following was maintained.

- Demographic parameters like, age, sex and materials status, cancer types
- Anthropometric parameters like BMI, skin fold thickness, Mid arm circumference (MAC), Mid arm muscle circumference (MAMC).
- Biochemical parameters like serum albumin and hemoglobin.

All the data was first collected before intiation of chemotherapy followed by re-evaluation after the 3rd round of treatment. In between each rounds of chemotherapeutic treatment, anthropometric parameters were re-evaluated.

Measurement of anthropometric parameters

1. Body mass index

It is calculated considering height and weight of the patient. Height was measured using stadiometer. The patients were asked to stand straight with their

feet together. Likewise weight was taken using weighing machine. The BMI was derived as- $BMI = \frac{\text{Weight (kg)}}{\text{height (m}^2)}$

According to WHO guidelines, if BMI is
 <18.5 Kg/m² → undeweight
 18.5 Kg/m²-24.9 Kg/m² → Normal
 25 Kg/m²-29.9 Kg/m² → Overweight
 >30 Kg/m² → Obse

2. Mid arm circumference (MAC)

It was measured using measuring tape. The tape was placed around the upper arm of the patients with the arm relaxed at their side.

3. Mid arm muscle circumference (MAMC)

It was obtained by measuring skin fold thickness of triceps (TSF) and MAC. TSF was measured by calibrated skin fold caliper. The measurement was taken at midway between olecranon and acromian process with arm vertically relaxed and palm facing upwards. Then, MAMC was calculated as – $MAMC = MAC \text{ (cm)} - (0.314 \times TSF \text{ in mm})$

The data was recorded in the form of mean ±sd. Changes in all the studied variables before and after the 3rd rounds of chemotherapy was analyzed using paired t-test and SPSS software.

RESULTS

In this study we had female preponderance (58.5%) compared to males (41.5%). Most of patients belong to age group of 40-50 years (33.5%) while 82% cases were married. Cancer of head and neck was the commonest variant observed (50.5%) followed by that of breast (30.5%) (table 1).

Table 1. Distribution of patient

Gender	Number	Percentage (%)
Male	83	41.5
Female	117	58.5
Age		
<20	9	4.5
20-30	43	21.5
30-40	22	11
40-50	67	33.5
50-60	34	17
>60	25	12.5
Marital status		
Married	164	82
Unmarried	36	18
Cancer types		
Breast	61	30.5
Cervix	46	23
Colon	12	6
Head and Neck	81	50.5

The mean age of patients was 49.2 years while mean height was 158.05 (table 2).

Table 2: Mean age and height of patients

Parameter	mean±sd
Age	49.2±10.7
Height	158.05±9.47

Table 3: Comparison of anthropometric parameters

Parameters	Before	After	p
Weight (Kg)	67.18±9.02	60.63±4.45	<0.01
BMI (Kg/m ²)	24.66±5.63	22.69±4.52	<0.01
TSF (mm)	13.82±3.61	13.91±2.93	<0.01
MAC (cm)	28.11±1.47	27.01±1.54	<0.01
MAMC (cm)	22.47±2.15	21.87±2.09	<0.01

Table 4: Comparison of biochemical parameters

Parameters	Before	After	p
Albumin (mg/dL)	3.49±0.65	3.06±1.49	<0.01
Hemoglobin(gm%)	11.3±1.42	9.47±1.64	<0.01

There was significant decrease in the values of anthropometric and biochemical parameters involved in this study (table 4, p<0.01).

DISCUSSION

In the present study irrespective to the cancer type, about 89% of the patients showed weight loss. Changes in weight specially, decrease in weight are critical indicators of malnutrition or the associated nutritional comorbidities in cancer patients. Like our study Davies *et al* also reported similar observation [14].

In our study there was significant reduction in all the studied anthropometric variables such as BMI, TSF, MAC, MAMC after the implementation of chemotherapy. It was in line with that of Bincy R *et al* [15]. As per Justine E *et al* [16] BMI has positive association especially with breast, esophagus, kidney and colon cancers. We also observed significant decrease in the level of albumin and hemoglobin after chemotherapy which was concordance to that of Bincy R *et al* and Naidu MUR *et al*. [15, 17]. Anemia, one of the most frequent hematological abnormalities in cancers patients remain undiagnosed and untreated leading o negative impact on prognosis.

This study clearly demonstrates that the nutritional status of head and neck cancer patients is altered in one half of cases due to multiple causes. Malnutrition was significantly more frequent among men, elderly subjects, patients with a history of alcohol abuse, patients with a pharyngeal tumour and advanced tumour stage. In 2004, Martin Villares et al. demonstrated that the risk of malnutrition increased with the quantity of alcohol consumed [19]. These authors also demonstrated that alcohol intake must be rapidly decreased or even stopped, at the stage of initial management of patients with head and neck cancer. Alcohol withdrawal can therefore promote correction of malnutrition [20].

On the basis of clinical interview and simple objective measures such as weight and height, the physician, assisted by a dietician, can rapidly assess the patient's nutritional status, the course of malnutrition and its main causes. These data can be recorded on a "nutrition form", as proposed in this study, or can be simply recorded in the patient's medical charts. However, a review of medical charts in our institution, prior to introduction of this nutrition form, revealed that these basic data were absent in more than two-thirds of cases. The Detsky index provides a subjective assessment of malnutrition, but allows noninvasive classification of patients with satisfactory reproducibility (90%) into three categories: A, B and C [21]. This index is particularly reliable for severely malnourished patients, as the correspondence between this index and objectively demonstrated severe malnutrition in this group of patients was 100% versus only 85% for moderately malnourished patients, due to the difficulty of distinguishing between moderately malnourished patients and well nourished or slightly malnourished patients. This index is nevertheless useful in clinical practice, as the concordance between subjective assessment of malnutrition and the objective assessment was 92% in our study population, in line with the results published in the literature.

In terms of objective criteria, weight loss less or equal to 5% has no impact on patient survival, while weight loss greater or equal to 10% is considered to be a prognostic marker in oncology, which is why this cut-off was used in the present study [22].

CONCLUSION

Our study shows that there is alteration in anthropometric and biochemical parameters induced by chemotherapy suggesting the derangement of nutritional status. Hence, assessment of baseline nutritional status before the start of chemotherapy along with regular follow up should be maintained so that the problem faced by cancerous patients due to poor nutritional status can be sorted. Also health care professional involved in proper management of cancer patients should ensure the proper supply of energy to prevent wasting syndrome and associated comorbidities.

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