Preoperative Nutritional Assessment in Elderly Cancer Patients Undergoing Elective Surgery: MNA or PG-SGA?

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Abstract This study aims to evaluate and compare the use of patient-generated subjective global assessment (PG-SGA) and mini nutritional assessment (MNA) as a preoperative nutritional assessment tool in elderly cancer patients. This was a prospective study carried out on 47 patients, 45 years and above suffering from cancer and admitted to Padmashree Dr. D.Y. Patil Medical College and Hospital, Pune. The patients were evaluated with PG-SGA and MNA tools at the time of admission and baseline data were collected. All patients had undergone surgeries as per indications. Postoperatively, the surgical outcomes and adverse events were noted and statistically evaluated. The average age of the study sample was 61.46 years and 29 patients were females. The patients classified by PG-SGA were ten in group A and 37 in group B and C. The patients classified by MNA were five in no risk group and 42 in group with patients at risk and malnourished. When evaluated with PG-SGA in group B and C, wound infections and requirement of change of antibiotic were seen in 86.4 % patients and their average day of onset of infection was 5.6 days. Antibiotics were administered to these patients for an average of 14.2 days and their average duration of stay was 29 days. On the other hand, the evaluation of patients with MNA, at risk and malnourished patients, wound infections, and requirement of change of antibiotic were seen in 81 % of patients and their average day of onset of infection was 5.6 days. Antibiotics were administered to these patients for an average of 13.8 days and their average duration of stay was 27 days. The results were statistically significant. The mini

nutritional assessment is more exhaustive in identifying patients at risk and is useful in screening populations to identify frail elderly persons allowing us to intervene earlier, thereby improving the patient prognosis. The patient-generated subjective global assessment is a more comprehensive tool for elderly cancer patients, which identifies a more extensive range of nutrition impact symptoms and predicts the postoperative outcomes more accurately. Authors recommend its usage in evaluating the aforementioned subset of patients.

Keywords PG-SGA · MNA · Elderly cancer patients

Introduction

It is well established that the older persons generally experience higher rates of undernutrition and are more prone to malnutrition than the general population [1]. While the prevalence of malnutrition in the free living elderly population is relatively low, the risk of malnutrition increases dramatically in the institutionalized and hospitalized elderly people [2]. The prevalence is even higher in elderly individuals suffering from cancer and is associated with cognitive decline [3].

Patients who are malnourished when admitted to the hospital tend to have longer hospital stays, experience more complications, and have greater risks of morbidity and mortality than those whose nutritional state is normal [4].

The patient-generated subjective global assessment (PG-SGA), adapted from the SGA and developed specifically for patients with cancer and formulated by Ottery in 1994. It has been accepted by the Oncology Nutrition Dietetic Practice Group of the American Dietetic Association as the standard for nutritional assessment for patients with cancer as a comprehensive assessment tool for cancer patients. It identifies a more extensive range of nutrition impact symptoms

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and allows triage of patients for appropriate nutrition interventions. The mini nutritional assessment (MNA) tool developed in France with collaboration from the Clinical Nutrition Program, University of New Mexico, USA and the Nestle Research Centre, Lausanne Switzerland.

Aims and Objectives

The aim of the study was to evaluate and compare the use of PG-SGA and MNA as a preoperative nutritional assessment tool in elderly cancer patients undergoing major elective surgeries in a tertiary health care setup.

Materials and Methods

The study included 47 patients aged 45 years and above suffering from cancer and admitted to Padmashree Dr. D.Y. Patil Medical College, Pimpri, Pune. It was conducted over a period of 2 years (July 2009 to September 2011). The patients were evaluated with PG-SGA and MNA at the time of admission and baseline data were collected. All patients had undergone surgeries as per indications. Postoperatively, the surgical outcomes were noted in terms of infections, onset of infection, requirement for change of antibiotics in the postoperative period, and duration of antibiotic use during hospital stay. The data collected were statistically evaluated using the proportion test and *t* test.

Results

The total sample size of 47 patients had an average age of 61.46 years. The patients on evaluation with PG-SGA were ten (21.3 %) in group PG-SGA-A. PG-SGA-B and PG-SGA-C were grouped together (37 patients) for evaluation purposes (Table 1). Similarly, MNA-classified five (10.6 %) cases were at “no risk of malnutrition.” “At risk of malnutrition” and “malnourished” were grouped together (42 patients) (Table 2). The patient sample included 18 males and 29 females. The mean MNA score of the study group was 14.42 and mean PG-SGA score of the patients was

11.65. PG-SGA and MNA were compared for sensitivity and specificity (Table 3).

Discussion

Various nutritional assessment tools are available for evaluation of different subsets of population. However, there are very few studies comparing nutritional assessment tools for elderly cancer patients. Aging is associated with a progressive depletion of lean body mass and muscle mass in particular. This phenomenon of aging starts at the age of 45 years [5]. Poor nutritional status in the elderly is associated with numerous factors, including decline in cognitive and functional status, chronic diseases, medications, poor dentition, isolation, and poverty. The nutritional status of the elderly individuals is difficult to estimate [4]. The cognitive decline frequently contributes further difficulties in assessment because of difficulties in obtaining correct information [6]. Medical teams are often insufficiently aware of the importance of nutritional assessment in elderly patients [4].

Kagansky et al. [4] in their study of 414 patients reported that 17.6 % were well nourished, 33.2 % were at risk of malnutrition, and 49.4 % were malnourished. The length of hospital stay was significantly associated with nutritional status. It increased from 28.3 days in the well-nourished group to 59.9 days in the malnourished group. In our study, the mean hospital stay was 16.2 days in the “no risk” group compared to 27.7 days in the “at risk + malnourished” group.

Morley and Thomas [7] attribute the “anorexia of aging” to disturbances in the ability to regulate the food intake. With age, the appetite is reduced, physical activity diminishes, and fat-free body mass decreases even in the absence of overt catabolic illness. Hospitalization; a deteriorated medical, functional, or cognitive state; and social problems can further contribute to malnutrition [8]. A reduced food intake in the elderly people has often been reported [9].

In a study of 178 patients by Soini et al. [10], 49 % were well nourished, 48 % were at risk of malnutrition, and 3 % were malnourished. The mean MNA score was 23.4. Other studies [11, 12] have reported figures of 22 in their series of patients. Van Nes et al. [13] studied the length of stay and in-hospital mortality in 1,145 patients. The MNA scores

Table 1 Outcomes as evaluated by PG-SGA

PG-SGA			
Parameter	A	B + C	P value ^a
Infection and requirement for antibiotic change	30 %	86.4 %	<0.0001
Day of onset of infection (average)	2.10±3.41	4.81±2.36	<0.05
Average duration of antibiotics (days)	9.30±4.11	14.22±3.69	<0.005
Duration of stay (days)	17.10±10.2	29.1±10.1	<0.005

^aStatistically significant

Table 2 Outcomes as evaluated by MNA

Parameter	MNA		
	A	B + C	P value ^a
Infection and requirement for antibiotic change	20 %	81 %	<0.0001
Day of onset of infection (average)	1.20±2.68	4.60±2.62	<0.05
Average duration of antibiotics (days)	8.20±2.49	13.76±4.04	<0.005
Duration of stay (days)	16.20±9.58	27.7±10.8	<0.005

^aStatistically significant

ranged from a minimum of 8 to a maximum of 27.5, with a median of 20.5. The median length of stay was closely related to MNA, and increased from 30.5 days in those with score ≥ 24 to 42 days in those with a score < 17 .

Pepersack et al. [14] confirm the high prevalence of poor nutritional status among geriatric hospitalized patients (82 % at risk and 31 % severely malnourished). Bleda et al. [15] in their study of 67 patients reported a mean MNA score of 20.84. They found a high interobserver reliability of MNA for the subjects institutionalized at two long-term geriatric units. In a study of 89 patients by Lopez et al. [16], the mean MNA score was 21.6; 7.9 % were malnourished, 61.8 % were at the risk of malnutrition, and 30.3 % were well nourished. The main factors determining nutritional risk are related to risk situations (global evaluation) and self-perception of health (subjective assessment). In our study, the mean MNA score was 14.42. We had five (10.6 %) cases in no risk group and 42 (89.3 %) cases in the “at risk of malnutrition + malnourished” group.

Cansado et al. [17] in a study of 531 patients reported 26.6 % of patients to be malnourished. A longer length of stay was correlated with ≥ 5 % weight loss in the hospital and was prevalent in patients at risk of undernutrition/malnourished as evaluated by MNA. Amirkalali et al. [18] reported an average MNA score of 23.6; 3.2 % were malnourished, 43.4 % were at risk of malnutrition, and 53.4 % were well nourished.

Bauer et al. [19] reported an average PG-SGA score of 5 in SGA-A, 14 in SGA-B, and 19.5 in SGA-C categories. The scored PG-SGA was able to identify malnourished patients with 98 % sensitivity. They also showed that PG-SGA was accurate at identifying the well-nourished patients from malnourished patients, with the prevalence of malnutrition in the study population being very high. The malnourished patients

had a significantly longer length of stay compared to well-nourished patients. In our study, the mean PG-SGA score was 11.65. PG-SGA had a sensitivity of 100 % and a specificity of 88 %.

The anorexia–cachexia syndrome is prevalent in patients with cancer, with approximately 20 % of cancer patient deaths being attributable to malnutrition [20, 21]. Early nutritional assessment can identify the problems to help patients increase or maintain weight, improve their response to treatment, and reduce the complications [22].

Isenring et al. [23], in their study of 60 patients, found 39 patients in class A, 17 patients in class B, and 4 patients in class C. The mean PG-SGA score was 6.4. There was a significant linear trend between PG-SGA scores for each of the SGA classifications. The prevalence of malnutrition was high with 35 % of patients malnourished at the beginning of treatment. Reilly et al. [24] and Naber et al. [25] have also reported that malnourished hospital patients had a longer length of stay than well-nourished patients.

In our study, PG-SGA had classified 37 patients in group B + C which was less than those classified by MNA as at risk of malnutrition and malnourished (42 patients). PG-SGA showed higher percentage of patients with wound infection and requirement of antibiotic change among the poorly nourished patients. Similarly on evaluation of other parameters, viz duration of antibiotic usage and duration of hospital stay, PG-SGA showed more significant results. It has also showed comparable values for average day of onset of infection. All the results were statistically significant. PG-SGA hence showed an overall very high sensitivity (100 %) and negative predictive values (100 %) when compared with MNA, whereas MNA demonstrated very high specificity.

The stressed state seen in advanced cancer results in far greater demand for amino acids released from muscle breakdown than occurs in fasting alone. When dietary protein is not spared or is inadequate in the diet, muscle catabolism provides the amino acids to maintain the protein mass of critical organs and tissues. It is also used to maintain the normal plasma glucose concentration, which ensures that energy is available to essential organs. The consequences of protein deficits are quickly exhibited as fatigue, delayed healing, poor immune response, and declining ability to maintain normal activities due to loss of lean body mass.

Table 3 PG-SGA vs MNA

Parameter	PG-SGA	MNA
Sensitivity	100 %	50 %
Specificity	88.1 %	100 %
Positive predictive value	50 %	100 %
Negative predictive value	100 %	88.1 %

When 40 % of these critical reserves are exhausted, mortality approaches 100 %. Loss of muscle mass is known to be detrimental in cancer and has been shown to predict recurrence and reduce survival [26].

It is important to note that the presentation of cancer patients to the surgical OPD in the Indian setting is in the late stage. This is evident from the fact that majority of patients were placed in PG-SGA-(B + C) and MNA (at risk + malnourished) category as compared to the Western literature wherein maximum patients were in the PG-SGA-A and MNA (no risk) category. This also implies that preoperative nutritional assessment is mandatory in all elderly cancer patients for an optimal outcome.

Conclusion

The PG-SGA is a more comprehensive tool for elderly cancer patients, which identifies a more extensive range of nutrition impact symptoms and predicts the postoperative outcomes more accurately. Authors recommend its usage in evaluating the aforementioned subset of patients.

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