

Mini Nutritional Assessment as screening tool to define treatment for bladder cancer patients: A cross-sectional study of a high volume center

Abstract

Introduction: Bladder cancer is an aggressive disease that begins in the cells lining the bladder, which grow abnormally due to mutations. The treatment of bladder cancer is complex, so a multi-professional team is necessary. One of the aggravating factors in treatment is the nutritional risk, contributing to increased morbidity and mortality. It decreases function and quality of life, increases length of hospitalization, and increases healthcare costs. In addition, bladder cancer has a higher incidence in the elderly, population at greater risk of lethality. Given this scenario, applying nutritional screening can be extremely important, since the nutritional condition can be aggravated during treatment and the progression of the disease. This study aimed to compare the results of the application of the MAN nutritional screening tool between the urology professionals and nutritionists at our center. This was a cross-sectional observational study. **Methods:** The target audience were adult patients diagnosed with bladder cancer followed up at the urology outpatient clinic who answered the nutritional screening of the MAN in the short version by the medical team and later, in the nutritional consultation, answered the full version of the instrument. The data was analyzed and organized using a RedCap database. The statistical program for data analysis was SPSS, for a comparison between continuous variables, the Mann-Whitney U test and Student's t-test were used. For the categorical variables, Wilcoxon Matched Pairs Test and Cohen Kappa test were used. A significance level of 5% ($p \leq 0.05$) with a confidence level of 95% was considered for all statistical tests. **Results:** 46 patients were evaluated. The medical team identified 18 (39.1%) with regular nutritional status, while the nutrition team identified 13 (28.3%). When compared with the full version of the MNA applied by the nutrition team, it was noted that 32 (69.6%) patients were at nutritional risk. Individual questions of the MNA short form were also compared between both groups' application and Wilcoxon matched pairs test performed. MNA-SF may be defined as an excellent screening tool when applied by a urologist with a sensibility of 87.5% ($p=0.87$), and by the nutritionist with a sensibility of 93.7% ($p=0.76$). It is observed a raw match rate of 71.7% from both questionnaires, after Cohen Kappa test, the agreement was moderate, with 77.9% of agreement ($k=0.50$). **Conclusion:** The application of MNA-SF has a high sensibility. However the MNA full version for nutritional screening is necessary to improve the sensibility of the assessment and guide the management of the nutritionist and the multidisciplinary team.

INTRODUCTION

In Brazil, it is estimated 15,854 new cases of bladder cancer per year and 5,630 deaths in 2020 (1). This represents approximately 2.7% of all diagnoses and 2.2% of deaths in the country, with a prevalence of 43,545 cases (2). Among the causes of bladder cancer, smoking is one of the main risk factors, regarding the action of carcinogenic substances in the bladder urothelium (4,5).

Bladder cancer management is complex and expensive. (3). Many patients present with several deficiencies, regarding, social, economic, and nutritional status. Therefore, a multidisciplinary team is mandatory to achieve better outcomes. One of the most relevant deficiencies is the nutritional risk, which is one of the main factors in the increase in morbidity and mortality. In addition, bladder cancer has a higher incidence in elderly patients, which implies a greater risk and lethality of the disease (3,6).

Early nutritional assessment is extremely important and must be carried out using anthropometric indicators, biochemical methods, food consumption, and nutritional screening (7). One of the instruments that can be used in nutritional screening is the Mini Nutritional Assessment (MNA), which is a validated, reliable, and rapid screening method (8).

The objective of the study is to compare the results of the applicability of the MNA nutritional screening instrument between medical and nutrition teams at the urology ambulatory (CABEM) at University Center FMABC.

Methods

This was a cross-sectional observational study. All patients answered the MNA short form (MNA-SF) and full version in the first medical and nutritional presentation, respectively. All adult patients diagnosed with muscle-invasive bladder cancer and evaluated by urologists and nutritionists followed by the bladder cancer group of the urology department (CABEM) of the Centro Universitário FMABC from January 2019 to January 2023, were included in this study. This study was carried out after the Local Ethic Committee approval (CAAE: 69806723.4.0000.0082)

MNA is a nutritional assessment method developed for the assessment of the elderly population, including healthy and debilitated people, intending to identify elderly patients with malnutrition and at risk of malnutrition and those who may benefit from early intervention (9). The maximum score, in the full version, can reach up to 30 points. A score between 24 to 30 points considers that the elderly person has a normal nutritional status, 17 to 23.5 points considers them to be at risk of malnutrition, and scores lower than 17 points consider them to be malnourished. The summarized version of the instrument has the subjective questions ahead: changes in food intake in the last three months (severe, moderate, or no decrease), weight loss in the past three months (more than 3 kg, between 1 and 3 kg, does not know how to inform, or without weight loss), mobility (restricted to bed or in a wheelchair, walks, but does not leave the house or move around normally), presence of psychological stress or acute illness in the last three months and neuropsychological problems (severe dementia or depression, light dementia or no problems). Regarding the objective information, the questions are about the anthropometric data (weight, height, and calf circumference). When classifying nutritional status according to the MNA summarized version, the sum of the scores was considered, with 14 points being the maximum to be achieved. The stratification of nutritional status according to the score observes the following classification: adequate nutritional status (MNA 12-14 points); risk of malnutrition (MNA 8-11 points); and malnutrition (MNA 0-7 points).

Primary outcome: To compare the malnutrition risk according to the MNA-SF score assessment applied by the urologist and nutritionist, respectively.

Secondary outcomes: To compare the short-form sensibility and agreement when applied by urologists and nutritionists

Statistical analysis

The data was analyzed and organized using RedCap database. The statistical program for data analysis was SPSS version 23 for Windows. For demographic data, the distribution of variables was described as mean and standard deviation or frequency and proportion, when applicable. For a comparison between continuous variables, the Mann-Whitney U test and Student's t-test were used, depending on the distributions found. For the categorical variables, Wilcoxon Matched Pairs Test and Cohen Kappa test were used. A significance level of 5% ($p \leq 0.05$) with a confidence level of 95% was considered for all statistical tests.

RESULTS

46 patients participated in the study, 37 (80.4%) of whom were male. The median age was 67.0 ± 9.7 years. Regarding the decrease in intake in the last three months, through the application of the MNA-SF by the medical team, 4 (8.7%) patients were found to have a moderate decrease, while the nutrition team found 17 (37.0%) individuals with the same classification, and regarding patients without decreased intake, 32 (69.6%) were identified by the medical team and 25 (54.3%) by the nutrition team. Regarding weight loss in the last three months, 22 (47.8%) individuals were identified as losing more than three kilos (Kg) by the medical team, while 21 (45.6%) were identified by the nutrition team. Regarding the psychological stress or acute illness question in the last three months, the medical team identified 22 (47.8%) individuals, while the nutrition team classified 36 (78.3%) individuals with symptoms. Regarding Body Mass Index (BMI), 31 (67.5%) individuals were found with ≥ 23 kg/m² by the medical team and 26 (56.5%) individuals classified by the nutrition team. Given the six questions applied in the summarized version of the MNA, the medical team classified 20 (43.5%) patients at risk of malnutrition, while the nutrition team classified 25 (54.3%) patients. The medical team identified 18 (39.1%) patients for the individuals with regular nutritional status, while the nutrition team identified 13 (28.3%). When compared with the full version of the MNA applied by the nutrition team, it is noted that 32 (69.6%) patients are at nutritional risk (Table 1).

When individual questions of the MNA-SF were compared between both groups' application and Wilcoxon matched pairs test, it may be defined as an excellent screening tool when applied by a urologist with a sensibility of 87.5% ($p=0.87$), and by the nutritionist with a sensibility of 93.7% ($p=0.76$). It is observed a raw match rate of 71.7% from both questionnaires, after Cohen kappa test, the agreement was moderate, with 77.9% of agreement ($k=0.50$). Regarding the short form, both groups had no difference in the screening scenario ($p=0.02$). Considering the complete MNA version and the malnutrition risk, the medical team had a higher false negative rate (21.7%) when compared with the nutrition team (8.6%), however with no statistical significance.

Table 1: Sex, age of individuals, nutritional screening (MNA) applied by the medical team and nutrition team, and statistical analysis

Sex and Age of Participants			
Variables	Feminine	Masculine	Total
Sex (n, %)	9 (19.6%)	37 (80.4%)	46 (100%)
Age (median, SD)	61 (9.2)	70 (8.2)	67 (9.7)
Questionnaire "screening" section of the Mini Nutritional Assessment (MNA)			
	MNA Urology	MNA Nutrition	
Variables			
Question 1 - Decrease in food intake in the last 3 months	n	n	
Severe decrease in intake	10 (21.7%)	4 (8.7%)	
Moderate decrease in intake	4 (8.7%)	17 (37.0%)	
No reduction in intake	32 (69.6)	25 (54.3%)	
Total	46 (100.0%)	46 (100.0%)	
Question 2 - Weight loss in the last 3 months	n	n	
More than three kilos	22 (47.8%)	21 (45.6%)	
Don't know how to inform	2 (4.4%)	4 (8.7%)	
Between one and three kilos	4 (8.7%)	2 (4.4%)	
No weight loss	18 (39.1%)	19 (41.3)	
Total	46 (100.0%)	46 (100.0%)	
Question 3 - Mobility	n	n	
Restricted to bed or wheelchair	1 (2.2%)	1 (2.2%)	
Walks but is unable to leave the house	1 (2.2%)	1 (2.2%)	
Normal	44 (95.6%)	44 (95.6%)	
Total	46 (100.0%)	46 (100.0%)	
Question 4 - Psychological stress or acute illness in the last 3 months	n	n	
Yes	22 (47.8%)	36 (78.3%)	
No	24 (52.2%)	10 (21.7%)	
Total	46 (100.0%)	46 (100.0%)	
Question 5 - Neuropsychological problems	n	n	
Severe dementia or depression	2 (4.4%)	1 (2.2%)	
Mild dementia	5 (10.8%)	0 (0.0%)	
No psychological problems	39 (84.8%)	45 (97.8%)	

Total	46 (100.0%)	46 (100.0%)
Question 6 - Body mass index (BMI)	n	n
BMI < 19	1 (2.2%)	3 (6.5%)
19 ≤ BMI < 21	5 (10.8%)	6 (13.1%)
21 ≤ BMI < 23	9 (19.5%)	11 (23.9%)
BMI ≥ 23	31 (67.5%)	26 (56.5%)
Total	46 (100.0%)	46 (100.0%)
Punctuation	n	n
12 - 14 points: normal nutritional status	18 (39.1%)	13 (28.3%)
8 - 11 points: at risk of malnutrition	20 (43.5%)	25 (54.3%)
0 -7 points: malnourished	8 (17.4%)	8 (17.4%)
Total	46 (100.0%)	46 (100.0%)
Full MNA score applied by the nutrition team		n
24 - 30 points: normal nutritional status		10 (21.7%)
17 – 23.5 points: at risk of malnutrition		32 (69.6%)
less than points: malnourished		4 (8.7%)
Total		46 (100.0%)
	MNA Urology	MNA Nutrition
Sensibility	87.5% (p=0.87)	93.7% (p=0.76)
	MNA Urology	MNA Nutrition
Malnutrition risk and false negative rate	21,7%	8,6%

DISCUSSION

In the elderly population, malnutrition and the risk of malnutrition are associated with increased mortality, regardless of the cause of death, which emphasizes the need for nutritional screening to identify these patients to improve their nutritional guidance and therapy (10). In the present study, there is a significant prevalence of individuals with reduced oral intake and weight loss of more than three kilograms (Kg) in the last three months, with 69.6% of individuals classified at nutritional risk according to the application of the MNA-SF by the nutrition team. Vieira et al (11). in their study with 146 elderly people, hospitalized at INCA (National Cancer Institute), intended to describe the nutritional profile of individuals with cancer through the MNA-SF and its comparison with anthropometric parameters, tumor location, and length of hospital stay. The characterization of the MNA-SF showed a prevalence of patients with reduced food intake and weight loss in the last three months, with 49.3% of individuals suffering from malnutrition, with a mortality rate of 13.7%, the majority being malnourished (55.5%).

A cross-sectional study carried out in an oncologic hospital in the city of Salvador, Bahia, included 371 elderly patients over the age of 65 with malignant tumors, regardless of location or stage of the disease. The study is part of a multicenter study conducted by the José Alencar Gomes da Silva National Cancer Institute (INCA) in 50 institutions that aid cancer patients in several cities in Brazil and Portugal (12). The sample consists of elderly people, admitted to the clinical and surgical hospital wards, from September to October 2014. The study showed that the majority of patients were male (61%), and, when evaluating the nutritional characterization, according to the MNA-SF, the majority of patients had inadequate nutritional status (59.0%), in addition to having some psychological stress or acute illness in the last three months (72.0%), data similar to this present study where 43.5% of the sample presented nutritional risk due to the application of the MNA-SF by the medical team and 54.3% of the sample due to the application by the nutrition team, in addition, 78.3% of the individuals presented some psychological stress or acute illness in the last three months according to the instrument applied by the nutrition team (13). Similar results were observed in the multicenter study developed by INCA, 2015, in which research by Oliveira et al. In a larger study, 3,257 patients were included (between institutions in Brazil and Portugal); of these, 73% had malnutrition and nutritional risk according to the MNA, while 60.6% and 64.6% had adequate nutritional status according to BMI and CP, respectively.

When the MNA nutritional screening instrument is applied in its full version, a higher percentage of patients at risk of malnutrition (69.6%) is found when compared to the application of the MNA-SF, both by the medical team and by the nutrition team, with percentage values of 43.5% and 54.3% respectively. Zukeran (14), in his study, investigated the association between frailty syndrome and nutritional risk assessed by the MNA and found no difference between the applicability of the instrument in its summarized version compared to the full version. Of the 580 individuals in the study sample, 42.1% were at risk of malnutrition when the short version of the MNA was applied and 42.8% when the full version of the MNA was applied. However, corroborating the data from the present study, Albay (15), in his study, analyzed whether the MNA-SF is sufficient to detect the risk of malnutrition in 75 patients with Parkinson's disease, and found that 32.5% of patients with the disease whose scores on the MNA-SF were classified as normal nutritional status, were classified as being at risk of malnutrition by the full MNA.

The MNA-SF may be an important tool in the first medical presentation to suspect malnutrition or risk of malnutrition. In this manuscript, similar rates of sensibility were noticed when applied by a medical or nutritional team, 87.5%, and 93.7%, respectively. Similar data are reported by Zhang & Edwards (16), who in a review study observed that the accuracy of MAN in elderly cancer patients is high (sensitivity = 0.77 and specificity = 0.96, AUC = 0.83). Therefore, the moderate rate of concordance between both observers ($k=0.5$; $p=0.02$) may guide the patient to a more careful and early nutritional intervention when a specific evaluation by the MNA complete version needs to be carried out by an expert nutritional team. Nutritional management through a multidisciplinary team is a major game changer in the bladder cancer war.

Aprile et al (17), demonstrate that in real practice malnutrition is often under-recognized and under-treated in cancer patients, given this scenario, it is crucial to facilitate integration between health professionals. For this to happen, professionals involved in detecting patients at risk of malnutrition should share nutritional information based on screening tools to improve their confidence in counseling cancer patients. A recent study showed that although oncologists, nurses, and nutritionists discuss the nutritional problems of the patients they care for, there is a need for greater intervention in nutritional management (18).

This study has its limitations. The retrospective fashion itself is a major limitation of this manuscript. It was a retrospective analysis of a small sample of patients.

Due to its cross-sectional design, no post-operative outcome was reported in this analysis. A future manuscript with the impact of nutritional management before radical cystectomy is being prepared by our group.

CONCLUSION

The MNA is a helpful nutritional screening tool, and its application was similar regardless of the professional who applied it. The application of its full version for nutritional screening is necessary to improve the sensitivity of the nutritional risk of malnutrition to guide the management of the nutritionist and the multidisciplinary team. Therefore, the presence of a nutritionist as part of the multidisciplinary team in the management of patients with bladder cancer contributes to improving the clinical and surgical management and optimizing the outcomes.

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