WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.074
Volume 8, Issue 2, 180-195. Research Article ISSN 2277– 7105

IN INTENSİVE CARE UNİT COMPARİNG OF "MALNUTRİTİON UNİVERSAL SCREENİNG TOOL" (MUST) AND "NUTRİTİONAL RİSK SCREENİNG" (NRS-2002) TESTS İN TERMS OF PROGNOSTİC ASPECT

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Article Received on
12 Dec. 2018,

Revised on 02 Jan. 2019,
Accepted on 23 Jan. 2019

DOI: 10.20959/wjpr20192-13980

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SUMMARY

250 patients aged 18 and older in Pamukkale University Medical Faculty Hospital Anesthesiology and Reanimation Department Intensive Care Unit(ICU), between April 2014 and November 2016 were enrolled to the study. In ICU admissions of patients age, sex, height, weight and BMI data were taken. The causes of hospitalization, current comorbidity, malignancy and infection were determined. Length of stay, hospital check out status of intensive care and services were examined. APACHE II and SAPS II values were established using vital findings, laboratory values, Glaskowe Come Scale (GCS), urine volumes, detection of chronic diseases, age and organ failure values. Anthropometrically; skin fold thickness, upper middle limb circumference measured. For the purpose of evaluate the nutritional status of the patient NRS-2002 and MUST screening tests were applied. NRS-2002 was grouped as malnutrition risk expected and in malnutrition risk, MUST was grouped as low malnourishment risk, middle malnutrition risk, and high malnutrition risk. 250 patients included the study, 101 patients were female, 149 patients were male and the mean age was 63. When the hospital leaving status of NRS-2002 risk groups is examined; at the survival group of 143 patients (%57); 47 patients (%32) were in the risk expected group, 96 patients (%67) were risk group and at the exitus group of 107 patients (%42), 17 patients (%15) were in the risk expected group, 90 patients (%84) were in risk group According to risk groups of MUST; at the survival group of 143 patients (%57) 50

patients (%34) were in the low risk group, 9 patients (%0,06) were medium risk group, 84 patients (%57) were high risk group and at the exitus group of 107 patients (%42), 5 patients (%0,04) were in the low risk group, 5 patients (%0,04) were medium risk group, 97 patients (%90) were high risk group When all of the data are evaluated; MUST screening test was more successful in detecting malnutrition-related mortality, whereas the NRS-2002 was more unsuccessful. Because there was a significant difference in the survival time between the MUST risk groups and no significant difference was found between the NRS-2002 risk groups. Therefore; we believe MUST to be more effective in predicting mortality in patients who will be performing malnutrition screening tests in intensive care units.

KEYWORDS: Malnutrition, mortaliy, NRS-2002, MUST.

INTRODUCTION

Malnutrition is defined by the World Health Organization (WHO) as a clinical condition resulting from insufficient supply of energy and nutrients in response to the body's energy and building block needs as a result of lack of nutrient or quantity in terms of nutrition. With an another definition, malnutrition breaking down of cellular balance providing nutrients and energy that human body maintain growing, maintenance and some special functions.

Malnutrition is a collection of clinical conditions that can affect all age groups in the world. It is an important problem that affects 22% to 58% of surgical and critically ill patients, leading to high hospital costs, long hospital stay times and associated complications, high infection risk and mortality.[1] Nutritional support due to optimal functioning of the organs, wound healing, adequacy of cardiopulmonary functions and continuity of the immune system is considered as a vital component of intensive care patients.[2]

Patients with critical disease in intensive care are at risk for malnutrition. Acute phase response in critical diseases; activating catabolism and a series of reactions, this hypermetabolic condition causes the malnutrition to start or worsen and increase mortality. This situation is more pronounced in elderly patients treated in intensive care. Malnutrition was found as 23-62% in patients staying in hospital and 85% of patients in nursing home.[3] In addition, studies have shown that 70% of patients with malnutrition presenting to the hospital cannot be diagnosed and 70-80% of patients leave the hospital without any nutritional support.[4] Therefore, patients should be evaluated clinically and appropriate nutritional support should be given according to this evaluation.[5]

In recent years, it is more appropriate to use enteral nutrition type in intensive care patients but this is not always possible. Parenteral nutrition is also usually a pillar of nutrition. Laboratory tests (albumin, nitrogen tests in urine, etc.), indirect calorimetry tests and anthropometric measurements (body mass index, biceps, triceps thickness measurement, waist and calf measurements, etc.) help to assess the nutritional status, but they have low sensitivity alone.

The use of parenteral and enteral nutrition types in intensive care patients led clinicians to determine whether these types of nutrition were adequate or not, and led to many studies to compare these types of nutrition. Although there are several methods for determining nutritional status in inpatients, the lack of a gold-standard assessment leads to difficulties in routine use, time loss and increased mortality in severe patients. In this study, our aim is to compare the relationship of various nutritional assessment methods with mortality and morbidity and the specificity of this relationship.

Malnutrition Universal Scanning Test (MUST)

Malnutrition Universal Scanning Test (MUST) is a method used to detect malnutrition, based on the relationship between impaired nutritional status and impaired body function. This evaluation method, which has a sensitivity of 61% and selectivity of 76%, has been observed to provide better results in hospitalized patients.[6]

MUST is achieved with a scoring system consisting of four stages.

- The BMI is calculated in the first stage. If the result is 20 or higher, the score is found as (0), if the results is between 18.5 and 20, the score is found as (1) and if the result is 1.5 and below, the score is found as (2).
- In the second stage, the weight loss of patients between 3-6 months is calculated. If the weight loss is less than 5%, the score is calculated as (0), if it is between 5%-10%, the score is calculated as(1), and if it is more than 10%, the score is calculated as (2).
- In the third stage, if the patient is not able to feed orally besides his or her acute disease or if he or she doesn't take any feed orally more than 5 days, the score is calculated as (2).
- In the last stage, scores are gathered and evaluated. If the total score is (0), they are accepted in low risk group, if it is 1(), they are accepted in medium risk group and if it is (2), they are accepted in high risk group.

Nutritional Risk Screening 2002 (NRS-2002)

Nutritional Risk Screening 2002 (NRS-2002) is a screening test used to determine the presence of malnutrition and the risk of malnutrition in the hospital. The aim is to find patients who are undernourished and at risk of malnutrition in the hospitalIt contains nutritional components of Malnutrition Universal Screening Test. In addition, it gradates the increased nutritional needs of the disease. It also includes age 70 and over as a risk factor.[7]

Scoring consists of two basic stages. In the first stage, BMI (<20.5), food intake in the last week, weight loss in the last 3 months and presence of serious disease are questioned. If there is a positive response to one of these four questions, the evaluation is continued. The severity of the disease and nutritional deterioration are evaluated with a score of 0-3. The total score is calculated by adding the age score to the score. Scores are shown in Table 3.[8,9]

MATERIALS AND METHOD

Demographically at acceptance of patients to the intensive care unit, age, gender, height, weight and BMI data of the patients have taken. The reason for the hospitalization of the patients to the intensive care unit, presence of comorbidity, malignancy and infection was determined. The length of stay in intensive care and services, hospital exit status were examined. APACHE II and SAPS II values were determined by using vital signs, laboratory values, GCS, urine quantities, chronic disease findings, age and organ failure values.

As anthropometric, skinfold thickness has measured three times by using calliper from the middle point of the triceps muscle behind the left arm, between the acromion and the olecranon; while the elbow is 90 degree. The arithmetic mean was then calculated. Upper arm middle circumference; Measured by determining the midpoint of the olecranon with a non-elastic tape measure and acromion.

Biochemically; Hemogram (hemoglobin, hematocrit, platelet, lymphocyte, leukocyte) and biochemistry (CRP, Glucose, AST, ALT, BUN, Creatine, Na, K, Cl, Ca, Ca Regulated, Mg, P, total cholesterol, albumin, pre albumin and transferrin) values were worked and recorded after admission to intensive care unit. Hemogram tests were performed on Roche Hitachi Cobes 8000 model and biochemistry tests were performed on Siemens Advia 2120i models within 30 minutes following blood collection.

NRS-2002 and MUST screening tests were performed to assess nutritional status. In NRS-2002, nutritional status, disease severity and age were evaluated. Patients were grouped as patient expected malnutrition and malnutrition. BMI, weight loss, acute disease status were evaluated in MUST test. Patients were grouped as low risk of malnutrition, moderate risk of malnutrition and high risk of malnutrition.

Statistical Analysis

Data were analyzed with IBM SPSS Statistics 22.0 Available for Windows. Continuous variables were calculated by adding mean ± standard deviation, median and minimum value-maximum value. Categorical variables are given in numbers and percentages.

One-way analysis of variance for the MRS groups and the Independent-Samples T-Test for the NRS-2002 groups were used to compare the differences between the groups when the parametric test assumptions were provided; When the parametric test assumptions were not provided, Mann-Whitney U test was used to compare the differences between NRS-2002 groups and Kruskal Wallis Variance Analysis for MUST groups. Pearson's chi-square test was used to compare the categorical variables and to examine the relationship between the variables of the two groups. Kaplan-Meier Survival analysis and Log-rank test were also performed for survival analyzes.

RESULTS

It was found that the mean age of the 250 patients included in the study was 62,20 ± 17,46, the mean height was 168,58 ± 9,88, the mean weight was 73,71 ± 18,52 and the mean BMI was 25,87 ± 6,18. It was seen that gender distribution of patients were; 101 (40.4%) women and 149 (59.6%) men (Table 4).

Table 1: Demographic findings of patients.

N=250	MEDIAN (Min-Maks)	Avg ±SD
Age (year)	63 (16 - 91)	62,2 ± 17,46
Height (cm)	169,5 (130 - 190)	168,58 ± 9,88
Weight (kg)	72,5 (30 - 146)	73,71 ± 18,52
Bmı	25,37 (14,69 - 49,95)	25,87 ± 6,18
Gender	**Number (n)**	**Percentage (%)**
Female	101	40,4
Male	149	59,6

Ort: Average; SD: Standard Deviation; Med: Median; Min-maks: The smallest and the biggest values.

However, when the age, Apache II score, SAPS II score, intensive care unit stay, and hospital stay were examined, there was a statistically significant difference between the risk groups of NRS 2002 risk group when compared to the group in which the risk was expected.

Table 2: Demographic distribution of the NRS 2002 score.

	NRS 2002		
Parametreler	**There is a risk n=186**	**Expected risk n=64**	**P**
Age (Year)	63,96 ± 16,54	57,09 ± 19,11	0,013*α
	64,5 (16 - 90)	61 (17 - 91)	
Gender (F/M)	72(%38,7)/	29 (%45,3)/	0,353Ω
	114(%61,3)	35 (%54,7)	
Height (cm)	168,72 ± 9,73	168,16 ± 10,38	0,695 β
	170 (140 - 190)	168 (130 - 186)	
Weight (kg)	73,54 ± 18,28	74,2 ± 19,34	0,926 α
	72,5 (38 - 146)	73 (30 - 132)	
BMI	25,82 ± 6,33	26,01 ± 5,76	0,797 α
	25,37 (14,69 - 49,95)	25,32 (17,58 - 48,05)	
Apache II Score	21,68 ± 8,62	18,75 ± 10,2	0,04* α
	21 (2 - 43)	18,5 (2 - 38)	
Saps II score	45,42 ± 18,97	33,95 ± 15,61	0,0001* α
	43 (4 - 113)	31 (12 - 82)	
Arm Circumference(cm)	24,41 ± 5,53	25,51 ± 5,28	0,168 β
	24 (12 - 44,5)	26,25 (16 - 37)	
Skinfold (cm)	1,38 ± 0,8	1,54 ± 0,75	0,075 α
	1,2 (0,2 - 4,5)	1,5 (0,3 - 3,2)	
Presence of Malignancy(Yes/no)	24 (%37,5)/	83(%44,6)/	0,320Ω
	40(%62,5)	114(%55,4)	
Intensive care stay Duration(day)	19,13 ± 23,82	7,86 ± 14,21	0,0001* α
	11,5 (1 - 163)	3 (1 - 102)	
Hospitalization duration (day)	25,99 ± 23,51	17,61 ± 17,14	0,002* α
	20 (2 - 163)	13 (1 - 102)	

*p<0,05 statistically significant difference; Ort: Average; SD: Standard deviation; Med: Mediance; Min-max: The smallest and the biggest values; α:Mann-Whitney U test; β: Significance test of difference between two mean Ω: pearson chi square test.

When age, weight, BMI, Apache II score, Saps II score, arm circumference, skinfold thickness, presence of malignancy, length of stay in hospital and length of hospitalization were examined, the difference between MUST risk groups was significant. Among MUST groups; In terms of age, the low-risk group was found to be significantly lower than the moderate-risk group, and the high-risk group in terms of weight and BMI was significantly lower than the middle-risk group.

Table 3: Demographic distribution of MUST score.

	MUST			
Parameters	**Low Risk n=55**	**Medium Risk n=14**	**High Risk n=181**	**P**
Age (Year)	57,49 ± 19,92	69,43 ± 19,65	63,08 ± 16,22	0,037* φ
	61 (17 - 88)	75,5 (18 - 90)	63 (16 - 91)	
Gender(F/M)	27 (%49,1)/	8 (%57,1)/	66 (%36,5)/	0,104 Ω
	28 (%50,9)	6 (%42,9)	115 (%63,5)	
Height (cm)	168,89 ± 10,05	165,57 ± 8,6	168,71 ± 9,94	0,502 δ
	170 (130 - 185)	168 (150 - 179)	170 (140 - 190)	
Weight (kg)	76,8 ± 17,65	82,79 ± 18,58	72,07 ± 18,55	0,016* φ
	78 (30 - 132)	80 (55 - 120)	71,5 (38 - 146)	
BKİ	26,76 ± 5,27	30,43 ± 8,02	25,25 ± 6,13	0,008* φ
	26,12 (17,75 - 43,1)	27,77 (20,2 - 49,95)	24,46 (14,69 - 49,93)	
Apache II Score	17,6 ± 10,16	23,14 ± 9,16	21,77 ± 8,57	0,018* φ
	17 (2 - 38)	24 (9 - 37)	21 (2 - 43)	
Saps II Score	32,49 ± 15,54	43 ± 15,87	45,49 ± 18,97	0,0001* φ
	29 (12 - 82)	41,5 (18 - 80)	43 (4 - 113)	
Arm Circumference (cm)	26,55 ± 4,78	24,47 ± 6,6	24,15 ± 5,49	0,001* φ
	27,1 (17 - 36,5)	22,6 (17 - 37)	24 (12 - 44,5)	
Skinfold (cm)	1,67 ± 0,67	1,66 ± 1,05	1,32 ± 0,78	0,0001* φ
	1,5 (0,5 - 3,2)	1,3 (0,5 - 4,5)	1,2 (0,2 - 4,5)	
Presence of Malignancy (yes/no)	19 (%34,5)/	2 (%14,3)/	95 (%52,5)/	0,020* Ω
	36 (%65,5)	12 (%85,7)	86 (%47,5)	
Intensive care stay Duration(day)	7,58 ± 13,06	13,86 ± 13,24	19,06 ± 24,34	0,0001* φ
	3 (1 - 80)	9,5 (1 - 46)	11 (1 - 163)	
Hospitalization duration (day)	17,45 ± 16,27	16,57 ± 13,12	26,35 ± 23,97	0,004* φ
	12 (1 - 81)	13,5 (2 - 49)	20 (2 - 163)	

*p<0,05 statistically significant difference; Ort: Average; SD: Standard deviation; Med: Mediance; Min-max: The smallest and biggest values; φ : Kruskal Wallis Variance analysis; δ: One way analysis of variance; Ω: pearsons chi square test.

In the investigation of biochemical values of patients; There was a statistically significant difference between CRP, lymphocyte #, lymphocyte, AST, BUN, creatine, Ca, total cholesterol, albumin, prealbumin and transferrin and NRS 2002 scores. Among NRS-2002 risk groups; In the expected risk group, CRP, AST, BUN and creatine values were significantly higher than the risk group.

Tablo 4: Biochemical evaluation of NRS 2002 score.

Parameters	**There is risk n=186**	**Risk expected n=64**	
	A.O ± S.D	A.O ± S.D	p
CRP	12,04 ± 10,43	9,59 ± 10,63	0,032* α
Hemoglobin	11,18 ± 2,23	11,55 ± 2,3	0,262 β
Haematocrit	34,56 ± 8,51	35,05 ± 6,52	0,393 α
Blood platelet	221,3 ± 139,81	231,06 ± 122,45	0,246 α

Lymphocyte#	9,44 ± 9,25	13,5 ± 11,92	0,002* α
Lymphocyte %	1,2 ± 1,33	1,67 ± 2,11	0,023* α
Leucocyte	14,74 ± 9,49	13,41 ± 6,88	0,622 α
Glucose	158,56 ± 61,09	151,58 ± 58,89	0,449 α
AST	78,21 ± 139,29	53,14 ± 75,94	0,05* α
ALT	59,28 ± 127,55	46,97 ± 100,75	0,188 α
BUN	34,55 ± 28,41	19,89 ± 15,17	0,0001* α
KREATİN	1,51 ± 1,47	0,82 ± 0,43	0,003* α
Na	140,08 ± 7,19	139,13 ± 6,44	0,865 α
K	4,24 ± 0,8	4,16 ± 0,74	0,456 β
Cl	101 ± 8,04	101,38 ± 5,95	0,423 α
Ca	8,28 ± 1	8,43 ± 0,58	0,017* α
Ca regulated	9,06 ± 0,91	8,95 ± 0,52	0,827 α
Mg	2,02 ± 0,56	1,92 ± 0,3	0,14 α
P	4,08 ± 1,86	3,54 ± 1,38	0,06 α
Total Cholesterol	123,25 ± 43,79	143,5 ± 57,2	0,011* α
Albumin	2,97 ± 0,62	3,29 ± 0,71	0,001* β
Prealbumin	11,13 ± 5,64	13,23 ± 5,5	0,006* α
Transferrin	134,64 ± 50,59	159,15 ± 57,03	0,002* α

*p<0,05 statistically significant difference; Ort: Average; SD: Standard deviation; Med: Mediance; Min-max: The smallest and biggest values; α:Mann-Whitney U test; β: Significance test of difference between two mean.

MUST risk groups; When CRP, hemoglobin, hematocrit, lymphocyte #, lymphocyte%, ALT, BUN, Ca, creatine, albumin, prealbumin and transferrin values were examined, a statistically significant difference was found between MUST risk groups.

Table 5: Biochemical evaluation of MUST score.

Parameters	**Low Risk n=55**	**Median Risk n=14**	**High risk n=181**	
	A.O ± S.D	A.O ± S.D	A.O ± S.D	p
CRP	9,7 ± 11,5	7,84 ± 7,66	12,21 ± 10,32	0,027* φ
Hemoglobin	11,64 ± 2,4	13,34 ± 2,63	11 ± 2,08	0,003* φ
Haematocrit	35,05 ± 7,06	41,24 ± 8,18	34,07 ± 8,11	0,005* φ
Trombosit	230,65 ± 116,99	202,64 ± 90,73	223,36 ± 143,57	0,525 φ
Lymphocyte#	13,36 ± 9,91	5,26 ± 5,89	10,01 ± 10,26	0,0001* φ
Lymphocyte %	1,84 ± 2,18	0,63 ± 0,42	1,22 ± 1,36	0,0001* φ
Leucocyte	14,36 ± 8,75	15,89 ± 11,92	14,3 ± 8,73	0,943 φ
Glucose	141,29 ± 45,51	172,93 ± 52,86	160,23 ± 64,29	0,081 φ
AST	49,95 ± 74,03	42,36 ± 26,82	80,71 ± 141,9	0,1 φ
ALT	33,89 ± 75,09	33,93 ± 27,01	64,6 ± 135,3	0,051* φ
BUN	19,87 ± 15,94	39,64 ± 46,52	33,44 ± 26,17	0,0001* φ
CREATINE	0,87 ± 0,54	1,27 ± 1,27	1,48 ± 1,45	0,126 φ
Na	139,51 ± 4,88	140,36 ± 9,34	139,9 ± 7,37	0,873 φ
K	4,13 ± 0,7	4,47 ± 0,83	4,22 ± 0,81	0,35 δ
Cl	102,35 ± 5,2	98,29 ± 10,58	100,93 ± 7,85	0,051* φ

Ca	8,44 ± 0,62	8,41 ± 0,6	8,28 ± 1	0,04* φ
Ca Regulated	8,93 ± 0,51	9,13 ± 0,37	9,05 ± 0,93	0,345 φ
Mg	1,93 ± 0,37	2,16 ± 0,42	2 ± 0,55	0,074 φ
P	3,7 ± 1,64	3,61 ± 1,05	4,04 ± 1,84	0,415 φ
Total Cholesterol	137,57 ± 49,2	133,43 ± 42,09	125,27 ± 48,3	0,123 φ
Albumin	3,36 ± 0,68	3,18 ± 0,64	2,94 ± 0,63	0,0001* δ
Prealbumin	13,35 ± 5,46	12,65 ± 5,92	11,09 ± 5,63	0,016* φ
Transferrin	161,74 ± 53,88	155,91 ± 61,76	133,43 ± 50,75	0,001* φ

*p<0,05 statistically significant difference; Ort: Average; SD: Standard deviation; Med: Mediance; Min-max: The smallest and biggest values; φ : Kruskal Wallis Variance Analysis; δ: One way Analysis of Variance.

When the hospital exit status in NRS-2002 risk groups is examined; Of 143 (57%) alive patients, 47 (32%) were in the expected risk group and 96 (67%) were in the risky group. Of 107 (42%) patients who were in exitus group 17 (15%) of them were in expected risk group and 90(84%) of them were in risky group. According to MUST risk groups; of the surviving 143 (57%) patients, 50 (34%) were in the low-risk group, 9 (0.06%) were in the moderate-risk group and 84 (57%)were in the high-risk group, according to exitus status; 5 (0.04%) of 107 patients (42%) were found to be at low risk, 5 (0.04%) moderate risk and 97 (90%) patients at high risk group.

Table 6: The Relationship Between MRS and MUST Scores with NRS 2002.

RESULT				**NRS-2002**		**Total**
				Expected	**Present**	
Alive	MUST	Low Risk	Sayı	38	12	50
			%	76,0%	24,0%	100,0%
		Moderate Risk	Sayı	4	5	9
			%	44,4%	55,6%	100,0%
		High Risk	Sayı	5	79	84
			%	6,0%	94,0%	100,0%
	Total		Sayı	47	96	143
			%	32,9%	67,1%	100,0%
Exitus	MUST	Low Risk	Sayı	5	0	5
			%	100,0%	0,0%	100,0%
		Moderate Risk	Sayı	0	5	5
			%	0,0%	100,0%	100,0%
		High Risk	Sayı	12	85	97
			%	12,4%	87,6%	100,0%
	Total			17	90	107
			%	15,9%	84,1%	100,0%
Total	MUST	Low Risk	Sayı	43	12	55
			%	78,2%	21,8%	100,0%
		Moderate Risk	Sayı	4	10	14

			%	28,6%	71,4%	100,0%
		High Risk	Sayı	17	164	181
			%	9,4%	90,6%	100,0%
	Total			64	186	250
			%	25,6%	74,4%	100,0%

Survival analysis did not show a significant difference between NRS 2002 risk groups in terms of survival period. However, the survival time of the people in the risk group was higher than the expected risk group. There was a significant difference between the MUST risk groups in terms of survival; it was significantly higher in the low-risk group than in the middle and high-risk groups. (Table 16).

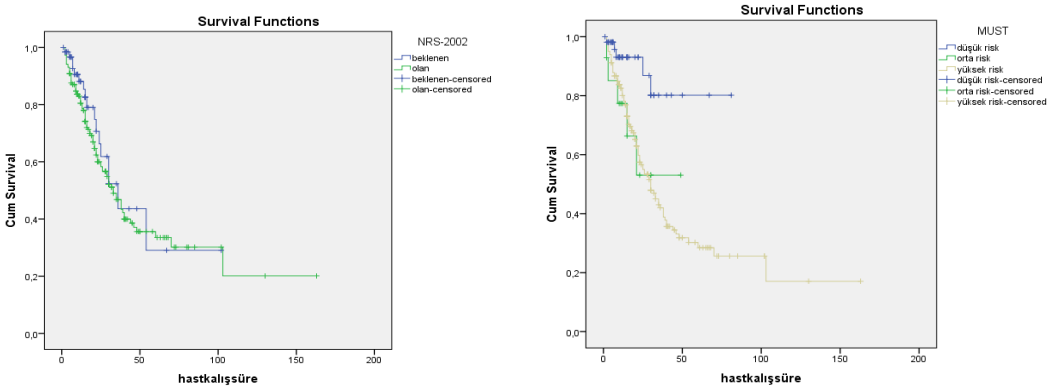

Figure 1: Survival Curve A. NRS 2002 B. MUST.

DISCUSSION

A parameter or test that can evaluate nutritional status from all aspects has not been developed yet. Calculation methods such as prognostic nutritional index (PNI) and nutritional risk index have been developed for this purpose. The NRS-2002 scoring is designed to screen the nutritional status of all hospitalized patients.[9] According to Kondrup et al., NRS-2002 is not a scoring system that only determines nutritional status(92). It is also defined as an assessment method for estimating changes in the clinical state due to possible post-scoring procedures. Corish et al. reported that the NRS-2002 scoring was more useful in terms of evaluating surgical patients than other methods (11). They attributed this to the methodology of identifying those who had a higher risk of postoperative complications than the surgical patient group, those at risk of losing more weight in the hospital and the duration of hospitalization due to malnutrition.

Since NRS-2002 has been recognized as a method of assessing nutritional status, it has been used in many studies to determine the risk of malnutrition.[10,11] In the study conducted by

KEPAN (Clinical Enteral and Parenteral Nutrition Association) in 2005-2006, a total of 29139 patients were evaluated at a total of 34 centers in 19 provinces in 6 months. As a result of a study in order to determine the risk of malnutrition during hospitalization, to find out the rate of taking nutritional support of risky patients and to determine the risk of malnutrition one week after hospitalization, it was reported that 15% malnutrition risk was determined in the hospitalized patients at the time of admission.[12]

In our study, we evaluated the nutritional status of 250 patients over 18 years of age who were hospitalized in the intensive care unit of Anesthesiology and Reanimation Department of Pamukkale University Hospital between April 2014 and November 2016 by measuring anthropometric and biochemical parameters. The causes of hospitalization, comorbidity and infection status of the patients were determined. Hospitalization period of the patients in intensive care and services, outpatient status of the patients and their distribution and malignancy presence were examined. APACHE II and SAPS II scores were calculated by evaluating the findings and examination results.

According to this study, the mean age of the patients was 63 years and when the min-max values [18-91] were examined, the average age of our patients is similar to the 65-year-old geriatric population in the literature except for several young patients. Malnutrition prevalence in the elderly is a known fact especially in care patients and hospitalized patients.[13,14] The results of both NRS-2002 and MUST screening tests have shown that there is a high risk of malnutrition above 70%. According to the literature discussed in more detail below, it can be said that one of the causes of our relatively high malnutrition patient population is our geriatric patient population. Studies have reported a relationship between nutritional status and mortality and / or morbidity, especially in older people.[15] Home care is made in 288 geriatric individuals; In a multivariate analysis of age, gender, BMI, weight loss and functional status, weight loss was found to be a significant indicator of mortality.[16] The mortality rate of our patients in our study was 42.8% and it was possible to say that the age factor had an effect on this rate.

According to NRS-2002 it was seen that, 61.3% of patients with malnutrition were male, 38.7% were female, 54.7% of the patients expected malnutrition were male and 45.3% female; According to the MUST, 63.5% of high risk group were male, 36.5% were female, and 50.9% of the low risk group were male and 49.1% were female. Although rates between

genders changed; there wasn't found any study that gender came to the forefront. It is concluded that there is no difference between NRS-2002 and MUST in terms of gender.

30-80% of patients with cancer develop weight loss during the course of the disease.[17] Weight loss and development tim changes depending on the affected tissue, tumor type, size / rate and stage. The study in a study made by Pressoir et all. in 2010 in France, nutritional status and hospitalization periods and mortality rates of 1545 adult patients with malignancy was compared. Malnutrition prevalence was determined as 30.9%. The duration of hospitalization was 19.3 ± 19.4 in the group with malnutrition and 13.3 ± 19.4 in the other groups ($p < 0.0001$) and the mortality at the patients with severe malnutrition was higher.[18]

In the study conducted by Clinical Enteral and Parenteral by the Nutrition Society in 2006 throughout Turkey, the frequency of malnutrition was screened during hospitalization (about 29 thousand patients) and it is understood that the highest proportion was in oncology (44%) and in intensive care units 52%.[12] In our study, the presence of cancer was present in 93 patients corresponding to 37.2% of our patients. When we examined it in terms of the length of hospital stay, we found the duration of stay in malnutrition cancer patients similar to the study of Pressoir et al.

We determined the NRS-2002 and MUST scores for each patient with data from all patients. In our study, according to NRS 2002, we evaluated patients with a score of > 3 in the nutritional status of our patients in the groups with the risk of malnutrition and the expected risk of malnutrition in two groups. According to the NRS-2002 screening test, 186 (74.4%) patients had a malnutrition and 64 (25.6%) patients had a risk of malnutrition.

Intensive care malnutrition rates in literature was found 42-43% in the study made by Giner et all (14) and Küçükardalı et all (19) whose results were evaluated with NRS-2002 and was found 62% in the study made by Mercadal et all. (20) In various references this rate can be as high as 85% in the elderly population (13).

The rate of patients with high risk of malnutrition was found to be 72.4% (181 patients) according to the results of our screening made with MUST. There was no statistically significant difference between MUST and NRS-2002 in high-risk patients. Both of the test were stated closer high risk patients. As mentioned in NRS-2002, the results of MUST screening were found within the literature. The results of the malnutrition screening tests

performed on the world are quite wide because of the heterogeneity of patient populations and different clinical units. In our study, the mean age was 63 years and we think that the ratio of the patient population is close to the upper limit due to the fact that our patient population is elderly and we are a tertiary referral center.

When the age, Apache II score, SAPS II score, the duration of intensive care stay and the duration of hospital stay were examined; both in the group with malnutrition according to NRS-2002 and in the high-risk group compared to MUST all these values were statistically high ($p<0,05$). Both tests were found to be correlated in groups with high risk for predicting outcome. The mean duration of intensive care stay of the group with malnutrition according to NRS-2002 was 19,13 days, while the mean age of malnutrition was 7,83 days. While the mean duration of intensive care unit stay of the group with high risk according to MUST was 19,06 days, the average duration of intensive care unit stay of the low-risk group was 7.58 days. According to NRS-2002 and MUST, the mean hospital stay was 25.99 days and 26.35 days in malnourished and high-risk groups, respectively. The groups with high risk for both ICU and hospitalization periods were found to be statistically significant different ($p <0.05$). In conclusion, according to our study, the duration of ICU and hospitalization of malnutrition patients was found to be significantly prolonged, and many publications in this literature were similar.[21-26] It should be noted that the duration of hospitalization is a parameter that can vary depending on many medical and / or paramedical reasons. The study of Dizdar et al. In 2007 investigated the suitability of hospitalizations and durations of internal diseases. 185 female and 217 male patients with a mean age of 55 years were evaluated. It was found that hospitalizations were prolonged mostly due to hospital-related factors, and 27% of them were found to be due to inappropriate timing, diagnostic procedures and delayed consultation, and 27% were prolonged due to test results.[27]

There was no statistically significant difference between the NRS-2002 risk groups according to the survival of the patients. However, MUST was significantly higher in the low risk group compared to the middle and high risk group. In the study of 107 patients who had died during the study, NRS-2002 identified 90 (84%) patients in the risk group, while MUST determined 97 of these 107 patients (90%) as high risk. Accordingly, it is possible to say that the MUST screening test is more successful in terms of survival analysis and mortality prediction. In a study by Henderson et al. (28), the MUST screening test was found to be successful in predicting survival and mortality in a similar way.

CONCLUSİON

Malnutrition is an important clinical condition with high rates of prognosis in patients with severe disease, especially at the time of admission to the hospital or due to disease and other factors. It is often overlooked and adversely affects treatment in patients without nutritional support. Therefore, in our intensive care unit, we aimed to find a fast, simple, accurate diagnosis of nutritional status at the time of hospitalization, as well as a test which predicts a high rate of prognosis.

For this purpose, NRS-2002 and MUST malnutrition screening tests that we compared; As a result of our evaluations, we concluded that the MUST screening test was more successful in detecting malnutrition-related mortality and the NRS-2002 test failed. Because while there was a significant difference between the MUST risk groups in terms of survival time, we could not detect any significant difference between NRS-2002 risk groups. There are also studies supporting our findings in the literature. Therefore; we believe that MUST screening test will be more effective in predicting mortality in malnourished patients in intensive care units.

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