Malnutrition-Inflammation Score in Hemodialysis Patients

Behrooz Ebrahimzadehkor,*1 Atamohammad Dorri,2 Abdolhamed Yapan-Gharavi3

1. Nursing Research Center, Research and Technology Deputy, Golestan University of Medical Sciences, Gorgan, Iran
2. Department of Control of Disease, Gonbad-e-Kavoos Health Center, Golestan University of Medical Science, Golestan, Iran
3. Department of Statistics, Gonbad-e-Kavoos Health Center, Golestan University of Medical Science, Golestan, Iran

Introduction

Chronic renal failure is the pathophysiologic process that has multiple causes and leads to reduced progressive number and performance of nephrons and finally the patients lead to distal renal failure [1]. More than 60 million worldwide people lose their lives annually due to the risk of kidney failure. According to the statistics, 1200 to 1600 people of Iran are diagnosed with this disease annually [2]. One of the common problems of chronic dialysis patients Protein-Energy Malnutrition (PEW). Because malnutrition is associated with deterioration of the disease, nutritional management of dialysis patients is a therapeutic strategy. Nutritional assessment is a basic and necessary process in the nutritional management of these patients. To assess the nutritional status of dialysis patients in various ways, including anthropometric measurements, biochemical parameters, performance evaluation and a comprehensive evaluation of diet or the Subjective Global Assessment method (SGA) is used [3].

The combined of all of these reliable and valid methods is known as a standard index system of precise malnutrition-inflammation (MIS: Malnutrition Inflammation Score) with. Several studies have been conducted in this area, internal and external [4, 5]. This study aimed to evaluate the score of malnutrition-inflammation and its relation to duration of dialysis patients in hemodialysis patients, Motahari Hospital, Gonbad-e-Kavoos, Iran.

Materials and Methods

In this cross-sectional study, from 60 patients of Motahari hospital dialysis center, 48 patients were randomly selected. Persons should be at least 18 years of age and at least 8 weeks of initiation of dialysis in the past and were able to interview and communicate and have no history of severe emotional disorders such as schizophrenia. The research was conducted based on the instructions approved by the Golestan University of Medical Sciences for the work with dialysis patients. For each patient malnutrition-inflammation questionnaire and some laboratory and demographic data that its reliability and validity had been examined previously in many studies, was completed [6-8]. The questionnaire included the patient's name, age, sex, ethnicity (Turkmen, Persian, Baluchi, Sistani, and Turks), occupation (unemployed,
housewives, workers and farmers, government employees, managers and senior staff, work independent
employees), the etiology of the disease (hypertension, glomerulonephritis, diabetes, urinary tract stones,
pyelonephritis, and congenital cystic kidney disease, lupus erythematosus, obstructive disease, trauma, or
unknown), history of dialysis time (referring to the patient's medical records) Weight and height
(anthropometric measurements), blood urea nitrogen, cholesterol, triglycerides, sodium, phosphorus, CRP
capacity, iron saturation (TIBC), Iron (measured in vitro) and malnutrition-inflammation score. Inflammation score
has 10 questions including SGA-7 questions and 3 other items that is body mass index, serum albumin and iron
saturation capacity (TIBC) [6, 8].

SGA questions are weight loss during the previous 6 months, symptoms of gastro-intestinal tract, such as
anorexia, nausea, vomiting, diarrhea, food intake, functional capacity (related to power failure), the history
of dialysis, loss of subcutaneous fat in the mild arm muscle area and arm muscle area of the lateral line of the
body and the muscles in the shoulder and quadriceps muscle of the thigh. Body mass index in four state ≥20,
18-19.9, 16-17.99 and <16 Kg/m², serum albumin, in the four-state ≥4, 3.9-3.5, 3.4-3 and <3 g/dl, and TIBC in four
state ≥250, 200-249, 199-150 and <150 g/dl was measured. So the 10 questions MIS score, each with four
status 0 (normal) to 3 (most severe) is your total score, score 0 (normal) to 30 (severe malnutrition). Boundary
point score (cut off) was set 6, because the screening tool must be able to identify more patients at risk of
malnutrition [7, 8].

Dry weight measurements (with little clothing as possible) within 10-20 minutes after dialysis session using
Seca scales (Made in Germany) with accurately ±100 g. The weight and body mass index (Kg) is calculated by
weight (Kg) divided the square of height (m) patients BMI values based on reference standards was divided in
groups: overweight (30-34.9 Kg/m²), grade II obesity (35-39.9 Kg/m²) and grade III obesity (greater than 40 Kg/m²) [9]. To
determine the biochemical parameters of the patients, 10 cc fasting blood was taken by laboratory technician
immediately after dialysis.

All experiments were performed in the hospital laboratory. Using the blood creatinine was measured with
JAFEE test, CRP with agglutination method, BUN with manual colorimetric method cholesterol and triglycerides
were determined by photometry using a diagnostic kit (all kits were tested at company construction) [10].
Anthropometric indicators were measured by experienced nurse. Questionnaires were completed by the
researcher during the interviews. Information obtained from the patients was analyzed using SPSS-11.5 software
and statistical tests of quantitative variables (One-Way ANOVA and then Tukey test and Pearson correlation and
Chi-square test). Statistical significance of less than 0.05 was considered acceptable.

Results
A total of 48 patients studied, 12 patients (25%) had good nutritional status, 26 patients (54.2%) with mild
malnutrition, 10 patients (20.8%) had moderate malnutrition and none were severe malnutrition. Mean of
patients MIS score was 9.31±3.91. Malnutrition rates in males and females were not significantly different. There
was positive and significant relationship between age and MIS score (p=0.035). There was also a significant
correlation between the level of education and MIS score (p=0.042). Chi-square test showed also significant effect
of dialysis duration less than 50 months, to incidence of malnutrition was ($χ^2=9.09$, $p=0.017$). A significant
positive Pearson correlation between MIS score and the serum calcium and serum iron results (r=0.336). A
significant relationship was not found with other indicators, such as blood cholesterol and triglycerides and
CRP. According to table 1 the age mean of malnuritied patients significantly higher than those with normal
nutritional status and educational level in normal subjects was higher than that of people with malnutrition (Table
1).

Discussion
In the present study, based on standard criteria MIS hat is combination of anthropometric, biochemical and SGA,
25% of patients had good nutritional status, 70% mild
malnutrition, 20% had mild to moderate malnutrition and none were severe malnutrition, that implies the nutritional
status of these patients is acceptable. Tabibi study on 291
hemodialysis patients admitted to hospitals in Tehran,
about 54% had mild to moderate malnutrition and others
was good nutritional status and none were suffering from
severe malnutrition [9]. These results are somewhat was
in line with our results. Mean of patients MIS score was
9.31±3.91. In Sweden study, by Klantrzadeh et al. this
score was 8.3±4.2 [10].
In this study, MIS score correlated directly with age, it means that the older patients are the less nutrition score. Some studies have found that age has an adverse effect on the incidence of malnutrition [11]. Results in our study may be due to genuine culture of the orient and the and strongly recommend action to the maintenance of elderly patients. Some studies did not show any effect of age on the incidence of malnutrition [12].

The study in Tehran found that the age group 60 years and over in comparison with less than 60 years age group had the higher malnutrition, this can be due to disease later in life and the underlying including infections and psychological disorders like depression and economic or physical disability in the preparation and consumption of food [13]. In our study, positive and significant relation between duration of dialysis and MIS score was found, this result was obtained in other studies [14], and this can be due to progressive and the gradual decline of health status in hemodialysis patients despite continuous dialysis. In our study, education level was inversely related to the incidence of malnutrition. Increased education can upgrade nutrition knowledge, increase household income and thus increase the food purchasing power and finally increase the nutritional status. Education level, effects on employment, occupation and income level and general household economic-social conditions [15]. In other studies, correlation of level of education patients and prevalence of malnutrition in patients have been not studied [15].

Acknowledgements

This paper was obtained from research project sponsored by Research Deputy of Golestan University of Medical Sciences

Authors’ Contributions

All authors had equal role in design, work, statistical analysis and manuscript writing.

Conflict of Interest

The authors declare no conflict of interest.

Funding/Support

Golestan University of Medical Science.

References

16. Renee de Mutsert, Diana C Grootendorst, Elisabeth W Boeschoten. Subjective global assessment of nutritional