

Frequency of Malnutrition Inflammation Complex Syndrome in Patients with End Stage Kidney Disease on Maintenance Hemodialysis Presenting to Tertiary Care Hospital, Karachi

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ABSTRACT

OBJECTIVE: To determine the frequency of Malnutrition Inflammation Complex Syndrome (MICS) in patients with End Stage kidney disease on maintenance hemodialysis patients presenting to tertiary care Hospital in Karachi.

DESIGN: A cross sectional study

SETTINGS: Department of Nephrology Jinnah Postgraduate Medical Center, Karachi

METHODS: Total of 62 patients was included through non-probability purposive sampling. All patients diagnosed with End stage kidney disease on maintenance hemodialysis (twice week for >3months) were included and patients with acute kidney injury, chronic infections and chronic liver disease were excluded. Malnutrition inflammation score (MIS) was used to determine malnutrition inflammation complex syndrome (MICS). Mean and standard deviation were calculated for continuous variables, and percentages or proportions for categorical variables. Chi square test was used to determine the proportion of MICS in Maintenance Hemodialysis patients.

RESULTS: Mean age was 46 years \pm 12.59 SD (range 18-72 years). 34 (55%) were females and 28 (45%) males. 26 (42%) patients had duration of Maintenance Hemodialysis <1 years and 28(45%) between 1-4 years. Frequency of malnutrition complex syndrome (MICS) in patients with end stage renal failure was noted in 60 (97%) patients, out of these 31(50%) patients had mild MICS and 29 (47%) patients moderate MICS. Mild and Moderate malnutrition complex syndrome (MICS) was more observed in age group of 31-40years (12% in mild and 14% in moderate MICS). Moderate MICS was higher in females and mild MICS was higher in male patients.

CONCLUSION: Our study concluded that most (97%) of our patients with end stage kidney disease on maintenance hemodialysis has evidence of malnutrition inflammation complex syndrome.

KEY WORDS: Malnutrition inflammation complex syndrome, MIS, Maintenance hemodialysis.

INTRODUCTION

It is estimated that patients with end stage kidney disease (ESKD) are more than 2,786,000 worldwide and among them approximately 2,164,000 are receiving renal replacement therapy in the form of hemodialysis.⁽¹⁾ The term dialysis is derived from Greek word "dialysis" mean dissolution and it is primarily used to provide an artificial standby for patients who lost kidney function due to renal failure.⁽²⁾ Death rate in maintenance hemodialysis patients continues to be unacceptably high all over the world (approximately 10-20% per year in developed countries).^(3,4) Inflammation and protein energy malnutrition is more prevalent in dialysis population, together they are also termed as malnutrition-inflammation complex syndrome (MICS).⁽⁵⁾ The poor clinical outcome and quality of life, high death and hospitalization rate are associated with this syndrome.^(6,7) Prevalence of Malnutrition is up to 75% in patients with end stage kidney disease (ESKD)

on Maintenance Hemodialysis.⁽⁸⁾ Subjective Global Assessment (SGA) score consists of; five components of a medical history (weight change, dietary intake, gastrointestinal symptoms, functional capacity, disease and its relation to nutritional requirements) and three components of a brief physical examination (signs of fat and muscle wasting, nutrition-associated alternations in fluid balance) to detect nutritional status.⁽⁹⁾ Kalantar-Zadeh et al formulated a system for scoring the malnutrition and inflammation in 2001, termed as malnutrition inflammation score (MIS) and this is based on the Subjective Global Assessment (SGA), but also includes Body mass index (BMI), serum albumin and transferrin concentration. In some studies in hemodialysis population, MIS was found superior to conventional SGA to detect malnutrition and inflammation. The MIS correlates the degree of severity of MICS in dialysis patients and has significant associations in terms of hospitalization,

morbidity and mortality.^(10,11)

Morbidity and mortality is high with the degree of MICS so it is important to know the proportion of MICS in local population. We conducted study to determine the frequency of Malnutrition Inflammation Complex Syndrome (MICS) with End Stage Renal Failure on maintenance hemodialysis patients presenting to tertiary care Hospital in Karachi.

MATERIAL AND METHODS

This cross sectional study was conducted at Department of Nephrology Jinnah Postgraduate Medical Center, Karachi from April 2009 to November 2009. Total of 62 patients were included through non-probability purposive sampling. All patients diagnosed with End stage kidney disease on maintenance hemodialysis were included and patients with acute kidney injury, chronic infections and chronic liver disease were excluded. End Stage kidney disease (ESKD) was defined as glomerular filtration rate of less than 15 ml/min. Malnutrition Inflammation Complex Syndrome (MICS) defined as presence of protein energy malnutrition and inflammation determined by MIS score includes; history (appetite, gastrointestinal symptoms such as nausea, vomiting, diarrhea, and functional status), physical examination such as Triceps Skin Fold (TSF) thickness measured by using a conventional skin fold caliper, Mid Arm Muscle Circumference (MAMC) measured with measuring tape and calculated through formula: MAMC = Mid Arm Circumference (MAC) – (3.14 x TSF) and laboratory measurements such as serum albumin and Total Iron Binding Capacity (TIBC). MIS is consists of 10 components, each component has four severity levels, ranging from 0 (normal) to 3 (severely malnourished). The sum of all 10 components therefore ranges from 0 (normal), 1-10 (mild), 11-20 (moderate) and 21-30 (severely malnourished) respectively.⁽¹¹⁾ Maintenance hemodialysis (MHD) was defined as hemodialysis twice weekly for >3 months.

Data Collection procedure: A written informed consent was taken from patients. Participant’s personal social demographic data such as age, gender, duration of hemodialysis and data regarding malnutrition inflammation complex risk was taken through history (nausea, vomiting, diarrhea, appetite, functional status), Physical examination (TSF thickness, dry weight change, MAC), BMI (Weight in kg /height in m²) and Pre-dialysis blood samples (serum total iron binding capacity and serum albumin). All data was taken by principal investigator on pretested structured questionnaire include MIS chart attached as Annexure-I.

Data Analysis: Data was double entered and analyzed in SPSS version 19. Descriptive statistics were

studied, mean and standard deviation for continuous variables (age, dry weight, TSF thickness, MAC, MAMC, serum albumin, TIBC) and percentages or proportions for categorical variables such as Age, gender, symptoms (nausea, vomiting, diarrhea, appetite, functional status), dry weight change, duration of Hemodialysis, BMI, MICS&MIS score. Chi square test was used to determine the proportion of MICS in Maintenance Hemodialysis patients. P-value of <0.05 was considered as statistically significant.

RESULTS

A total of 62 patients were included. Mean age was 46 years ±12.59 SD (range 18-72 years), mean of serum albumin was 3.64± 0.55 mg/dl (3.49 to 3.78) and BMI was 22.33 ± 3.69 kg/m² (21.38 to 23.26) as shown in table I. Out of 62 patients, 34(55%) were female and 28(45%) were male. 26 (41.9%) patients had duration of MHD <1 years and 28(45.2%) had between 1-4 years. Frequency of MICS in patients with ESRF by using Malnutrition Inflammation score (MIS) is noted in 60(97%) patients. Regarding severity of MICS, 31 (50%) patients were mild MICS (1 to 10 MIS) and 29 (47%) patients were moderate MICS (11 to 20 MIS) while severe MICS (21 to 30 MIS) were not observed in this study. Mild MICS was higher (12%) in age of group of 31-40 years and over 60 years of age groups as compare to 10% in 41-50 years and 51-60 years respectively, similarly moderate malnutrition complex syndrome (MICS) was higher in age groups of 31-40 years (14%) as compare to 12% in 41-50 years, 10% in 51-60 years and 4% in over 60 years. Mild MICS was higher in male patients while Moderate MICS was in females as shown in table II. Malnutrition complex syndrome in patients with end stage kidney disease with respect to duration of MHD is shown in figure III.

TABLE I: DESCRIPTIVE STATISTICS

Variables	Mean (SD)	95%CI	Range
Age (Years)	46.2± 12.6	42.98 to 49.37	18-72
Dry weight (Kg)	57.7 ± 13.3	36.34 to 45.67	41.5-70
BMI (kg/m ²)	22.3± 3.70	21.38 to 23.26	14-30.1
TSF (cm)	1.20 ± 0.50	3.22 to 3.67	0.49-1.5
MAC (cm)	24.1 ± 2.80	21.36 to 45.55	17.7-28.9
MAMC (cm)	20.3 ± 2.70	19.8 to 23.34	16.2-24
TIBC (mg/dl)	256 ± 23.2	35.5 to 39.74	160-350
Serum Albumin (mg/dl)	3.64 ± 0.55	3.49 to 3.78	2.3-4.9

TABLE II: FREQUENCIES OF VARIABLES

Variables	Total		Mild MICS		Moderate MICS		P-value
	n	%	n	%	n	%	
Age							
<30yrs	10	16%	05	08%	05	08%	0.005
31-40yrs	16	26%	07	12%	08	14%	
41-50yrs	14	22%	06	10%	03	12%	
51-60yrs	12	20%	06	10%	06	10%	
>60yrs	10	16%	07	12%	07	04%	
Gender							
Male	28	45%	18	64%	10	32%	0.030
Female	34	55%	13	38%	21	59%	
Duration of Hemodialysis							
<1 years	26	42%	14	23%	10	17%	0.140
1-4yrs	32	51%	16	27%	16	27%	
>4yrs	04	07%	01	01%	03	05%	

FIGURE I: PROPORTION OF MICS WITH DIFFERENT AGE GROUPS IN PERCENTAGE %

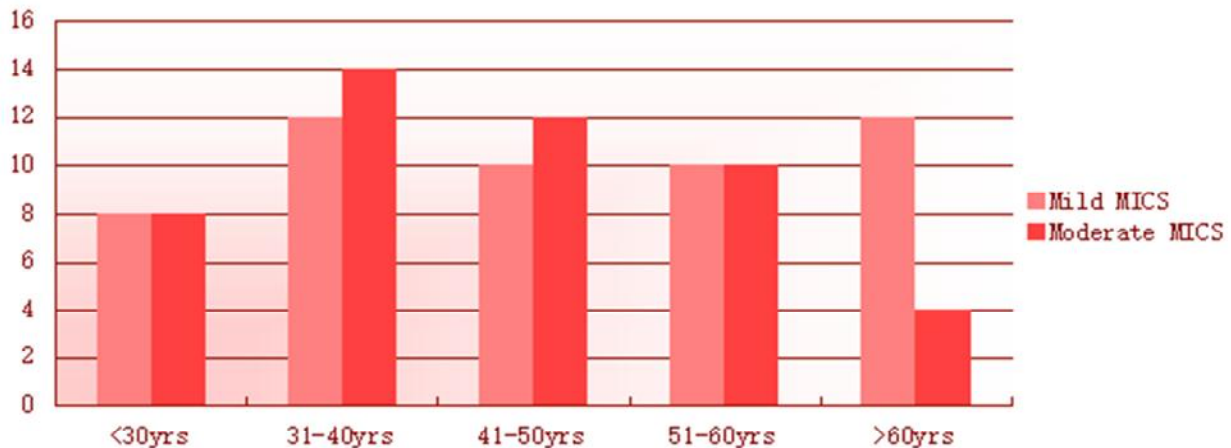


FIGURE II: SEVERITY OF MALNUTRITION COMPLEX SYNDROME (MICS) IN PATIENTS WITH END STAGE RENAL FAILURE (n=62)

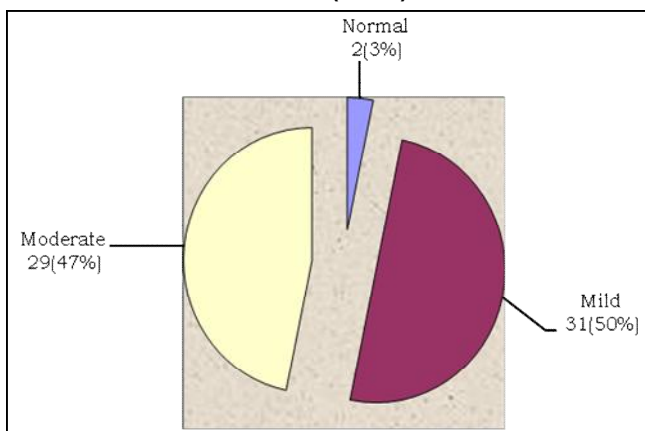
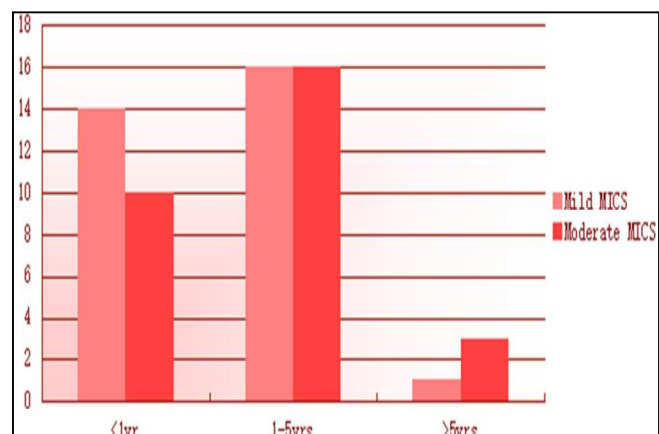


FIGURE III: PROPORTION OF SEVERITY OF MICS WITH DURATION OF MAINTENANCE HEMODIALYSIS IN NUMBERS



DISCUSSION

There are many causes of Malnutrition in chronic kidney disease (CKD) patients and the etiology is multifactorial.⁽⁸⁾ Renal insufficiency itself is a catabolic and inflammatory condition. Garg et al found that more than 30% of individuals with GFR <60 ml/min/1.73 m² were malnourished.⁽¹²⁾ So it is clear that renal insufficiency is a major risk factor for malnutrition. In our study 97% of patients with ESKD on maintenance hemodialysis had MICS. This prevalence is higher than the developed countries where prevalence of malnutrition is reported up to 80%.⁽⁸⁾ This high proportion is mainly due to poor socioeconomic conditions in the developing countries and related consequences such as inadequate dialysis and poor nutritional intake due to unnecessary dietary restriction. Most of the patients were already malnourished before coming to the dialysis unit because of lack of counseling by non-renal physicians who try to treat renal failure with protein restriction. These unnecessary dietary restrictions lead to increased catabolism in the body leading to rise in morbidity and mortality. In addition, late referral to Nephrologist by the treating physicians is also a contributing factor. Also most of our patients are under dialyzed due to financial and social problems and inadequate duration of dialysis.

In our study most of our patients had a mean serum albumin 3.64 ± 0.55g/dl. This also correlates the study conducted by Anees et al which reported mean serum albumin level of 3.64 ± 0.59g/dl.⁽¹³⁾ Also it has been reported in various studies that serum albumin may well be normal despite significant anthropometric abnormalities.⁽¹³⁾ In our study, mean BMI of was 22.3 ± 3.69kg/m² which is slightly higher than mean BMI reported in the study conducted by Anees et al (mean BMI 20.7 ± 4.0 kg/m²).⁽¹⁴⁾ Another study conducted by Umair et al reported mean BMI of 19.8 ± 2.9kg/m².⁽¹⁵⁾ The high BMI in our study may be explained by the fact that most (87%) of our patients had duration of hemodialysis below 4 years because of poor patient survival.

CONCLUSION

Our study concluded that most (97%) of our patients with end stage renal failure on maintenance hemodialysis has evidence of malnutrition inflammation complex syndrome. This is an alarming figure, keeping in view of the high morbidity and mortality associated with MICS. Although there has been extensive research worldwide regarding malnutrition, and inflammation in ESKD patients on dialysis, there is paucity of data regarding the nutritional and inflammatory status of dialysis patients in Pakistan emphasizing the need of further research which will not only decrease the rate of hospitalization but will also improve clinical

outcome in terms of morbidity, mortality and quality of life.

One of the core limitations of the study was small sample size and further studies are required at large scale.

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