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Original Research Article

Subjective global assessment of the patients of chronic kidney disease undergoing dialysis

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ABSTRACT

Background: Malnutrition is an important risk factor in patients with chronic kidney disease and in those undergoing maintenance dialysis. Subjective global assessment is a reliable method to evaluate malnutrition in these patients. This study aims to evaluate malnutrition in patients of chronic kidney disease using subjective global assesment score.
Methods: A cross sectional study was conducted at SRN Hospital, Allahabad, Uttar Pradesh, India on patients attending Nephrology Unit from July 2014 to May 2015.The nutritional status of 100 patients was evaluated using dietary recall, anthropometry, biochemical parameter and subjective global assessment. There were 67 males and 23 females. Their mean age was 46.8 years. Subjective global assessment was done using 7 variables derived from medical history and physical examination. Each variable was scored from 1-5 depending on the severity. The subjective global assessment score was correlated with the standard methods.
Results: Out of 100 patients 29% were mildly malnourished, 64% were moderately malnourished and 7% were severely malnourished. The age, triceps thickness, serum urea and cholesterol were correlated with the malnutrition score (r value 0.2, -0.3, 0.2, 0.4 respectively and p-value 0.3, 0.002, 0.007, 0.001 respectively). It was found that the serum albumin (r value -0.21, p-value 0.42) level did not correlate well with the subjective global assessment.
Conclusions: The subjective global assessment can be used reliably to assess the malnutrition in the patients of chronic kidney disease and hence useful in prognostication of disease and is a convenient bedside tool, operable even with paramedics.

Keywords: CKD, Malnutrition, SGA

INTRODUCTION

Kidneys are the principal organs involved in nutritional balance in the body.[1] Malnutrition is usually defined as poor nutritional status resulting from poor nutrient intake. In patients with CKD and especially in those undergoing maintenance dialysis, the so-called uremic malnutrition (also referred to as protein-energy wasting [PEW]) is by far the strongest risk factor for adverse outcomes and death.[2] Patients undergoing dialysis die of the short-term consequences of PEW and do not live long enough to die of risk factors associated with overnutrition.[3,4] CKD encompasses a spectrum of different pathophysiologic processes associated with abnormal kidney function and a progressive decline in glomerular filtration rate (GFR).[5,6]

Nutritional assessment of patients with CKD is a vital function of health care providers.[7-9] SGA is a tool that uses 5 components (i.e. weight change, dietary intake, gastrointestinal symptoms, functional capacity, disease) and its relation to nutritional requirements, medical history and 3 components of a brief physical examination

signs (fat and muscle wasting, nutrition-associated alternations in fluid balance) to assess nutritional status.[10,11] The nutrition plays an important role in the chronic disease of kidney.[12] Hence, this study assesses the subjective global assessment of patient of chronic kidney disease by using subjective global assessment proforma and measures the degree of malnutrition through it.

METHODS

This was a cross sectional study during a period of one year from July 2014 to May 2015. The study included the patients attending the nephrology OPD and admitted in SRN hospital of MLN Medical College. The patients were provided with the proforma about the different parameters of the SGA.

Modified subjective global assessment- dialysis malnutrition score[13]

The modified SGA- dialysis malnutrition score (DMS) consists of seven features: weight change, dietary intake, GI symptoms, functional capacity, co-morbidity, subcutaneous fat and signs of muscle wasting. Each component has a score from 1 (normal) to 5 (very severe).

Thus, the malnutrition score (sum of all seven components) is a number between 7 (normal) and 35 (severely malnourished). Lower score denotes tendency towards a normal nutritional status. A higher score is an indicator of the presence of malnutrition elements i.e. protein energy malnutrition.

Table 1: Modified subjective global assessment dialysis malnutrition score.

Patients related medical history				
Weight change in past six months				
1	2	3	4	5
No weight change or gain (<5%)	Minor weight loss	Wt loss 5 to 10%	Wt loss 10 to 15%	Wt loss >15%
Dietary intake				
1	2	3	4	5
No change Decrease	Sub optimal solid diet	Full liquid or moderate overall	Hypo caloric liquid	Starvation
1	2	3	4	5
No symptoms	Nausea	Vomiting or moderate	Diarrhea	Severe anorexia
1	2	3	4	5
None (improved) Normal activity	Difficulty with no /little activity	Difficulty with ambulation	Little activity ridden	Bed/chair
1	2	3	4	5
MDH<12 month and healthy otherwise	MDH 1-2 years or mild co-morbidity	MDH 2-4 years or age>75 or moderate co-morbidity	MDH>4 years or severe co-morbidity	Very severe multiple co-morbidity
1	2	3	4	5
None (no change)		Moderate		Severe
1	2	3	4	5
None (no change)	Mild	Moderate	Moderately severe	Severe

Table 1 shows the scoring sheet which consist of two parts and seven elements as described. During each patient's evaluation, a questionnaire regarding the first five components or 'patients related medical history' was obtained to facilitate the optimal evaluation. For 'weight change' the overall change in the post-dialysis weight, dry weight in the past 6 months was considered. The lowest score 1 was given if there was no weight change or if the patient had gained weight. 'Dietary intake', which was reported by the patients during interview, was scored 1 (normal) and 5 for starvation. 'Gastrointestinal symptoms' were scored 1 if there were no symptoms and 5 for severe anorexia. 'Functional capacity' was score 1 for normal functional capacity and/or any considerable improvement in the level of previous functional impairment and 5 for persistent bed/chair-ridden state. Co morbidity was scored as 1 if there were no other medical problem (otherwise healthy) and if the patient had been hemodialyzed for less than 1 year and 5 if there were very severe, multiple co morbidities.

Physical examination consists of two sections subcutaneous fat and muscle wasting. 'Body fat stores' (subcutaneous fat) was scored by assessing subcutaneous fat deposition in four body areas: Below the eyes, triceps, biceps and in chest area. Signs of muscle wasting were

obtained by briefly examining seven sites: Temple, clavicle, scapula, ribs, quadriceps, knee and interosseous muscles. After completion of physical examinations, patients were placed in one of three groups: mild nourished, moderate malnutrition and severe malnutrition.

Malnutrition score = sum of all numbers

- Minimum 7
- Maximum 35
- Well-nourished 7
- Mild >7 < 21
- Moderate 21-34
- Severe malnutrition 35

The statistical analysis was carried out using SPSS. Correlation between Malnutrition score and various variables were calculated using Pearson correlation coefficient (r value).

RESULTS

In the present study 100 patients were taken from 18 years to 70 years. Out of 100 patients 37 % were females and 63% were males, their mean age was 46.8 year. All the patients were in category of stage 4 or stage 5, the stage 4 consists of 16 patients whereas 84 patients were in stage 5. The malnutrition score was calculated in 100 patients out of which 29% were mildly malnourished, 64% were moderately malnourished and 7% were severely malnourished. Table 2 shows the relation between malnutrition score and age groups, maximum number of patients were moderately malnourished and belonged to 40-49-year age group.

Table 2: The Malnutrition score and age distribution.

Age (years)	Malnutrition score			Total
	7-20	21-34	35	
20 less	0	2	0	2
20-29	3	8	0	11
30-39	6	8	0	14
40-49	12	22	0	34
50-59	8	8	5	21
60 and above	0	15	2	18
Total	**29**	**64**	**7**	**100**

64.0% of patients were moderately malnourished, 29.0% were mildly malnourished while only 7.0% patients were severely malnourished (Table 3).

Table 3: Degree of malnutrition of patients.

Malnutrition score	Number of patients	Percent
7-20	29	29.0
21-34	64	64.0
35	7	7.0
Total	**100**	**100.0**

Table 4: Serum albumin and malnutrition score.

Malnutrition Score	Mean total albumin (gm/dl)	SD	No. of patients
7-20	3.12	0.31	29
21-34	2.92	0.30	64
35	2.96	0.05	7
Total	**2.98**	**0.30**	**100**

Table 5: Correlation between malnutrition score and various variables.

Correlation of malnutrition with	Pearson correlation coefficient (r value)	Correlation	p value	Significance (S is significant)
Age (years)	0.221	Positive	0.0.31	S
Weight (kg)	0.138	Positive	0.198	NS
S Creatinine (gm/dl)	[-0.002]	Negative	0.98	NS
Urea (gm/dl)	0.28	Positive	0.007	S
SiPTH# (pg/dl)	0.16	Positive	0.88	NS
Stage	[-0.13]	Negative	0.22	NS
eGFR* (min/1.73/m^2)	[-0.11]	Negative	0.27	NS
Triceps thickness (mm)	[-0.31]	Negative	0.002	S
Biceps thickness (mm)	[-0.39]	Negative	<0.001	S
24 hr protein (gm/d)	[-0.08]	Negative	0.42	NS
Total Protein (gm/dl)	[-0.13]	Negative	0.23	NS
Total Albumin (gm/dl)	[-0.21]	Negative	0.042	NS
S Cholesterol (mg/dl)	0.44	Positive	<0.001	S

#SiPTH serum intact parathyroid hormone; *eGFR estimated glomerular filtration rate.

Table 4 reveals that level of serum albumin decreases with the increasing malnutrition score. The levels of serum albumin were more in mildly malnourished patients while it was lower in severely malnourished patients.

It was observed in this study that a large number of male patients were in stage 5 and were moderately malnourished. Serum urea and serum cholesterol level were significantly high in moderate and severe malnutrition than in mild malnourished group, while eGFR (calculated by MDRD formula) was significantly lower in moderate and severe malnutrition than in mild. Serum. cholesterol level was significantly high in moderate and severe malnourished patients. Triceps thickness was less in severely malnourished patients.

There was significant correlation between SGA malnutrition score and the serum urea, serum cholesterol, age and triceps thickness while no significant correlation was found between other variables (Table 5).

DISCUSSION

Malnutrition is an important prognostic factor in chronic kidney disease.[14,15] Both protein and the energy intake is reduced in chronic kidney disease because of the abnormal metabolism in peripheral as well as in hepatosplanchnic tissues.[16] The malnutrition indicators are serum. albumin, pre-albumin and skinfold thickness. The SGA is a tool which can rapidly assess the malnutrition score with minimal technical requirement.

The present study focused on the significance of the use of SGA in assessing the severity of malnutrition in patients of CKD on dialysis. The malnutrition score is calculated and patients were categorised as mild, moderate and severely malnourished and none of the patient were having adequate nutrition. A significant correlation was found with age, triceps thickness, serum urea, serum cholesterol to SGA score while SGA score is not statistically significant with levels of serum albumin.

The serum albumin is not a specific marker for malnutrition as its synthesis is affected by poor energy and protein intake, inflammation, metabolic processes, age, co morbidity, fluid overload (i.e. plasma volume) and urinary albumin losses.[17] Moreover there is a reduction in the albumin synthesis during acute illness. The presence of acute or chronic inflammation limits the specificity of serum albumin as a nutritional marker.[18,19]

The result of present study correlates with other studies Girija K et al, Taptiwala S et al, Detsky et al, Zadeh K et al, Julian et al, Shrodhkar and Mohandas. It can be said that SGA is emerging as a rapid and fairly accurate and simple tool to assess the malnutrition in patients of CKD. Another positive feature is that it can be used by paramedical staff also as it requires minimum disease related knowledge.

Recently, a study conducted by N. Prasad et al, compared nutritional risk index (NRI) with SGA and its was found that NRI carries high sensitivity but low specificity as compared to SGA.[20] It can be used as screening tool but not as a diagnostic tool for assessment of nutritional status in peritoneal dialysis patients because of its low specificity and NPV.

The scoring system of SGA is reproducible and can be used to assess the change in trend of the disease related to protein and calorie metabolism. Unlike other studies, this study is more informative because it correlates malnutrition score with change in serum urea, serum cholesterol and with also age. Although further analysis is required.

CONCLUSION

The present study emphasized that subjective global assessment can be used reliably to assess the malnutrition in the patients of chronic kidney disease. Serum albumin is not correlated to the malnutrition score calculated by SGA. It is a reliable and convenient bedside tool, operable with even paramedics.

Future studies may be required to comprehend these changes in trends of malnutrition in prognosis of CKD.

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REFERENCES

1. Bargman JM, Skorecki K. Chronic Kidney Disease. Harrison's principles of internal medicine. 2015;19:1811-21.
2. Chung S, Koh ES, Shin SJ, Park CW. Malnutrition in patients with chronic kidney disease. Open J Intern Med. 2012;2:89-99.
3. Kovesdy CP, Kalantar-Zadeh K. Why is protein-energy wasting associated with mortality in chronic kidney disease? Semin Nephrol. 2009;29:3-14.
4. Menon V, Wang X, Greene T, Beck GJ, Kusek JW, Marcovina SM, et al. Relationship between C-reactive protein, albumin, and cardiovascular disease in patients with chronic kidney disease. Am J Kidney Dis. 2003;42:44-52.
5. Summary of recommendation statement. Kidney Int Suppl. 2013;3(1):5-14.
6. Singh NP, Ingle GK, Saini VK, Jami A, Beniwal P, Lal M, et al. Prevalence of low glomerular filtration rate, proteinuria and associated risk factors in North India using cockcroft-gault and modification of diet in renal disease equation: an observational, cross-sectional study. BMC Nephrol. 2009;10:4.
7. Girija K, Radha R. Correlation between subjective global assessment (SGA) and serum albumin in

haemodialysis patients. Int J Rec Sci Res. 2015;6(2);2790-3.
8. Tapiawala S, Vora H, Patel Z, Badve S, Shah B. Subjective global assessment of nutritional status of patients with chronic renal insufficiency and end stage renal disease on dialysis. JAPI. 2006;54:923-6.
9. Persson C, Sjoden PO, Glimelius B. The Swedish version of the patient-generated subjective global assessment of nutritional status: Gastrointestinal Vs urological cancers. Clin Nutr. 1999;18:71-7.
10. Detsky AS, Baker JP, Mendelson RA, Wolman SL, Wesson DE, Jeejeebhoy KN. Evaluating the accuracy of nutritional assessment techniques applied to hospitalized patients: Methodology and comparisons. J Parenter Enteral Nutr. 1984;8:1539.
11. Steiber AL, Kalantar-Zadeh K, Secker D, McCarthy M, Sehgal A, McCann L. Subjective global assessment in chronic kidney disease: a review. J Ren Nutr. 2004;14(4):191-200.
12. Kalantar-Zadeh K, Block G, McAllister CJ, Humphreys MH, Kopple JD: Appetite and inflammation, nutrition, anemia, and clinical outcome in haemodialysis patients. Am J Clin Nutr. 2004;80:299-307.
13. Kalantar-Zadeh K, Kleiner M, Dunne E, Lee GH, Luft FC. A modified quantitative subjective global assessment of nutrition for dialysis patients. Nephrol Dial Transplant. 1999;14:1732-8.
14. Jeejeebhoy KN. Clinical and functional assessments. In: Shils ME, Olson JA, Shike M, editors. Modern Nutrition in Health and Disease. 8th ed. Philadelphia: Lea and Febiger; 1994.805-811.
15. Janardhan V, Soundararajan P, Rani NV, Kannan G, Thennarasu P, Chacko RA, et al. Prediction of malnutrition using modified subjective global assessment-dialysis malnutrition score in Patients on hamodialysis. Indian J Pharm Sci. 2011 Jan-Feb; 73(1): 38-45.
16. Cano N Service d'Hépato-Gastroentérologie et Nutrition, Centre Hospitalier privé "Résidence du Parc", rue Gaston-Berger, 13362 Marseille Cedex 10. njm.cano@wanadoo.fr Annales de Medecine Interne. 2000;151(7):563-4.
17. Gama-Axelsson T, Heimbürger O, Stenvinkel P, Bárány P, Lindholm B, Qureshi AR. Serum albumin as predictor of nutritional status in patients with ESRD. Clin J Am Soc Nephrol. 2012;7(9):1446-53.
18. Durnin JV, Womersley J. Body fat assessed from total body density and its estimation from skinfold thickness: measurements on 481 men and women aged from 16 to 72 years. Br J Nutr. 1974;32:77-97.
19. Bishop CW, Bowen PE, Ritchey SJ. Norms for nutritional assessment of American adults for upper arm anthropometry. Am J Clin Nutr. 1981;34:2530-9.
20. Prasad N, Sinha A, Gupta A, Bhadauria D, Manjunath R, Kaul A, et al. Validity of nutrition risk index as a malnutrition screening tool compared with subjective global assessment in end stage renal disease patients on peritoneal dialysis. Indian J Nephrol. 2016;26:27-32.

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