Subjective Global Assessment of Nutritional Status of Patients with Chronic Renal Insufficiency and End Stage Renal Disease on Dialysis


Abstract

Objectives: (1) To assess the nutritional status of chronic renal insufficiency (CRI) and dialysis patients using the subjective global assessment (SGA) method. (2) To validate SGA in assessing the nutritional status of this group of patients.

Participants: The nutritional status of 81 patients was evaluated using dietary recall, anthropometry, biochemical parameters and SGA. There were 51 males and 30 females. Their mean ± SD age was 53.8 ± 14.3 years. There were 27 patients with CRI on conservative management, 38 patients with end stage renal disease (ESRD) on maintenance hemodialysis (HD) and 16 patients with ESRD on continuous ambulatory peritoneal dialysis (CAPD).

Methods: SGA was done using seven variables derived from medical history and physical examination. Each variable was scored from 1-7 depending on the severity. The SGA scores were correlated with the standard methods.

Results: Thirteen (48%) patients with CRI, 22 (58%) patients on HD and 8 (50%) patients on CAPD were malnourished. It was seen that the dietary protein & calorie intake and serum albumin level did not correlate well with the SGA scores. The anthropometric measures correlated with the SGA scores (Skinfolds and SGA r = 0.2, MAC and SGA r = 0.5 and MAMC and SGA r = 0.5).

Conclusion: Malnutrition is an important complication in CRI patients and ESRD patients on dialysis. SGA is a reliable method of assessing nutritional status. Most important is the fact that it can detect the changing trend of nutritional status, which may be missed by one-time anthropometry and biochemical methods.

INTRODUCTION

Western and Indian studies report a high prevalence of protein energy malnutrition (PEM) in patients with chronic renal insufficiency (CRI) and in patients with end stage renal disease (ESRD) on dialysis. The strongest evidence comes from the Modification of Diet in Renal Disease (MDRD) study, which is the largest multicentre trial performed in USA. This study showed that, in patients with chronic renal insufficiency, as renal function decreases, dietary protein and energy intake, anthropometric parameters and biochemical markers of nutrition progressively decline. Even we have observed that the calorie and protein intake of Indian patients with CRI and ESRD is poor. Besides the fact that nutrient intake declines with progressive renal failure, other factors also contribute to malnutrition in patients with CRI. These include decreased nutrient utilization, intercurrent illness, altered hormonal and metabolic function and imposed restrictions on diet. Malnutrition has an important clinical implication because it is well known that malnutrition is a powerful predictor of morbidity and mortality. This makes it necessary to assess the nutritional status of renal failure patients periodically and take measures to prevent PEM. The various methods commonly used for assessment of nutritional status are dietary recall, anthropometric measurements and biochemical parameters like albumin, pre-albumin and transferrin. These methods have to be used in conjunction, are time consuming and complex. Subjective Global assessment (SGA) is simple, reliable and dynamic. It provides a sound estimation of nutritional status.
There are some western studies that have used the SGA as a tool for assessing the nutritional status of CRI and dialysis patients. In the Indian literature there is only one study, which has used SGA to assess the nutritional status in MHD patients. In view of very limited SGA studies done in patients with CRI, further evaluation of use of SGA in this group of patients and its correlation with the standard methods would be of interest. The present study was planned keeping the following aims:

1. To assess the nutritional status of CRI & dialysis patients using the SGA method.
2. To correlate SGA with the standard methods of assessment of nutritional status.

**MATERIALS AND METHODS**

**Patients**

Eighty-one patients were included in the study. These patients were divided into 3 groups. Group I comprised of 27 CRI (defined as creatinine value persistently >1.5 mg%), patients, group II comprised of 38 stable ESRD patients who were on hemodialysis (HD) for at least 6 months and group III comprised of 16 stable ESRD patients on continuous ambulatory peritoneal dialysis (CAPD).

**Nutritional Assessment**

A one time SGA score was calculated based on the history and physical examination as described by Destky et al (Appendix). The history focused on 7 variables, namely: weight change in preceding 6 months and 2 weeks, change in dietary intake, presence of GI symptoms, change in functional capacity, subcutaneous loss of fat, muscle wasting and edema. Loss of subcutaneous fat was assessed over triceps, biceps and the fat pads below the eyes and muscle wasting was assessed on examination of temples, clavicle and shoulder. A seven point scoring system was applied to the above 7 variables. The patients were classified into 3 groups according to the points scored as follows: well nourished (score 1-14), mild to moderately malnourished (score 15-35) and severely malnourished (score 36-49).

Nutritional status was also evaluated by using standard methods of nutritional assessment like dietary calorie and protein intake, biochemical parameters and anthropometric measurements. Biochemical parameters included measurement of s.albumin. Anthropometric measurements included height, weight, body mass index (BMI), subcutaneous fat (triceps skin fold, biceps skin fold and Subcapular skin fold), mid arm circumference (MAC) and mid arm muscle circumference (MAMC).

**Statistical Analysis**

All values are expressed as mean ± 1 standard deviation. The results from standard methods were then correlated with SGA scores.

**RESULTS**

The age and sex distribution of the 81 patients included in the study was as shown in Table 1.

Table 2 summarizes the results of SGA. It was seen that 48% of CRI patients, 58% of the HD patients and 50% of the CAPD patients were mild to moderately malnourished.

Table 3 shows the protein and calorie intake (as assessed by dietary recall). It was significantly low in all the 3 groups.

Table 4 shows the results of the measurements of the BMI, skin folds, MAC, MAMC and s. albumin levels. Here too it was evident that the results were poor in all the 3 groups. It was worse in dialysis patients.

It was seen that the dietary protein & calorie intake and serum albumin level did not correlate well with the SGA scores. The anthropometric measures correlated with the SGA scores (Skinfolds and SGA r= 0.2, MAC and SGA r= 0.5 and MAMC and SGA r=0.5).

**DISCUSSION**

Malnutrition is a common finding in patients with CRI and ESRD. In the recent years the importance of nutritional assessment in patients with CRI and ESRD has been emphasized by studies showing that malnutrition is associated with an increased risk of morbidity and mortality. Therefore, periodic assessment of nutritional status and taking appropriate measures is important in improving the outcome.
A number of studies in individuals without renal diseases indicate that diet diaries & interviews provide quantitative information concerning intake of protein, energy and other nutrients. The same applies to the patients with CRI, patients on maintenance hemodialysis and CAPD. However the validity and reliability of the dietary interviews and diaries depend on the patient’s ability to provide accurate data and ability of the nutritionist to conduct detailed, probing interviews.

Biochemical parameters like serum albumin, transferrin and pre-albumin levels are extensively used to assess the nutritional status. They do not necessarily correlate with changes in other nutritional parameters, and can be influenced by non-nutritional factors. The non-nutritional factors that can affect these parameters are infection, inflammation, hydration status, peritoneal or urinary albumin losses and acidemia. The drop in s. albumin, which is the most widely used parameter of assessing nutritional status, is not only less specific but also lags behind the onset of malnutrition.

Anthropometry provides a semiquantitative estimate of the components of body mass, particularly the bone, muscle and fat compartments, and thus gives us information concerning nutritional status. However it requires precise techniques of measurement and the use of proper equipment to give accurate and reproducible data.

Subjective Global Assessment refers to the overall evaluation of a patient by an experienced clinician. It correlates the subjective and objective aspects of medical history and physical examination. It also satisfactorily agrees with objective methods of assessing malnutrition. Moreover SGA is inexpensive, can be performed rapidly, requires only brief training, gives a global score of nutrition and is reproducible.

In our study it was observed that 43 out of 81 (53%) subjects were mild to moderately malnourished by the SGA method of nutritional assessment. This correlated with the anthropometeric measurements. SGA did not correlate with diet recall. This is understandable because dietary recall is based on the patient’s ability to recall his intake. Hence it may overestimate or underestimate the protein and calorie intake. SGA did not correlate with the s. albumin levels also. This is probably due to the fact, that a fall in s. albumin levels lags much behind the onset of malnutrition.

It is necessary to observe the trend of nutritional status to appreciate the development of malnutrition. This may be missed by one-time anthropometric measurements and biochemical parameters. For example a patient may be obese to start with and later may lose some weight. This will show a normal anthropometric assessment,

### Table 4: Anthropometric and S. Albumin Values of Patients

<table>
<thead>
<tr>
<th>Sex</th>
<th>CRI</th>
<th>HD</th>
<th>CAPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body mass index</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>23.5 ± 2.5</td>
<td>24.1 ± 3.1</td>
<td>21.92 ± 3.63</td>
</tr>
<tr>
<td>Females</td>
<td>26.18 ± 2.72</td>
<td>26.78 ± 5.8</td>
<td>21.05 ± 5.79</td>
</tr>
<tr>
<td>Skin fold thickness (mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>11.91 ± 3.47</td>
<td>9.13 ± 3.38</td>
<td>10.73 ± 3.64</td>
</tr>
<tr>
<td>Females</td>
<td>17.2 ± 4.41</td>
<td>11.84 ± 5.25</td>
<td>12.29 ± 6.14</td>
</tr>
<tr>
<td>MAC (mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>297.05 ± 23.38</td>
<td>282.45 ± 47.49</td>
<td>288.88 ± 31.74</td>
</tr>
<tr>
<td>Females</td>
<td>303.00 ± 33.00</td>
<td>277.69 ± 55.0</td>
<td>290 ± 28.28</td>
</tr>
<tr>
<td>MAMC (mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>260.63 ± 22.87</td>
<td>253.11 ± 9.4</td>
<td>252.11 ± 25.47</td>
</tr>
<tr>
<td>Females</td>
<td>240.95 ± 24.68</td>
<td>249.0 ± 32.9</td>
<td>250.43 ± 33.28</td>
</tr>
<tr>
<td>S. Albumin (g/dl)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>3.5 ± 0.7</td>
<td>3.1 ± 0.5</td>
<td>2.9 ± 0.5</td>
</tr>
<tr>
<td>Females</td>
<td>3.4 ± 0.7</td>
<td>3.2 ± 0.5</td>
<td>2.9 ± 0.6</td>
</tr>
</tbody>
</table>

MAC - Mid arm circumference, MAMC - Mid arm muscle circumference

### Appendix: Subjective Global Assessment

I. WEIGHT CHANGE OVER past 2 weeks and LAST 6 MONTHS

- weight gain, no change, mild
  - wt loss (>0.5 kgs but < 1 kgs) 1-2
  - moderate wt loss (>1 kgs but < 5 %) 3-5
  - severe wt loss (>5%) 6-7

II. CHANGE IN DIETARY INTAKE

- No change or slight change for a short Duration 1-2
- Intake borderline and increasing 3-5
- Intake borderline or poor and decreasing 6-7

III. PRESENCE OF GI SYMPTOMS

- Few intermittent or no symptoms 1-2
- Some symptoms for >2 weeks or severe symptoms that is improving 3-5
- Symptoms daily or frequently >2 weeks 6-7

IV. FUNCTIONAL STATE

- No impairment in strength/ stamina or mild to moderate loss and now improving 1-2
- Mild to moderate loss of strength/ stamina in daily activity or severe loss but now improving 3-5
- Severe loss of strength/ stamina or bed ridden 6-7

V. SUBCUTANEOUS LOSS OF FAT

- Little or no loss 1-2
- Mild-moderate in all areas 3-5
- Severe loss in some or most areas 6-7

VII. MUSCLE WASTING

- Little or no loss 1-2
- Mild-moderate in all areas 3-5
- Severe loss in some or most areas 6-7

VIII. EDema

- Little or no edema 1-2
- Mild-moderate edema 3-5
- Severe edema 6-7

Minimum score = 7, Maximum score = 49; 1-14 - well nourished, 15-35 - mild to moderate malnourishment and 36-49 - severe malnourishment
but on SGA score a deteriorating nutritional status. SGA can also be used for continuous quality improvement (CQI).10

In conclusion, our study shows that malnutrition is present in almost 50% of cases even before they initiate dialysis. This has important clinical implication because there is a tendency of most physicians to impose several dietary restrictions to patients with CRI and ESRD on dialysis. SGA can be used regularly in routine clinical practice to assess the nutritional status and make appropriate recommendations to prevent malnutrition.

REFERENCES