



# Subjective Global Assessment as It Pertains to the Nutritional Status of Dialysis Patients

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**While determination of nutritional status is often based on objective measurements such as biochemical parameters and anthropometric measurements, there is no single measurement that can reliably predict the risk for malnutrition or absolutely identify malnutrition. This is particularly true in dialysis patients, since many of the conventional nutritional indicators are altered in the presence of renal disease. It is often difficult to distinguish between the effects of actual nutrient deprivation and those effects that result from the process of diminishing kidney function and ultimate kidney failure. The search for appropriate methods to accurately assess the nutritional status of patients with kidney disease is ongoing. A number of recent journal articles have introduced the use of subjective global assessment (SGA) in renal patients. The purpose of this paper is to review the literature regarding SGA, to describe the technique, and to share SGA tools that have been developed for Satellite Dialysis Centers, Inc., Redwood City, California.**

## **KEY WORDS: nutrition**

The initial work by Baker et al. established the use of clinical assessment to determine the nutritional status of general surgery patients.<sup>1</sup> The nutritional status of 59 patients, admitted to the hospital for elective surgery, was assessed using both clinical and objective methods. Baker's group demonstrated a clear correlation of the clinical classification with the objective measures of nutritional status, as well as with three measures of hospital morbidity (incidence of infection, use of antibiotics, and length of stay). Interobserver reproducibility was demonstrated by the agreement of two independent examiners in 81% of the assessments, or 72% more often than could be explained by chance. They concluded that clinical assessment is both reproducible and valid.<sup>1</sup>

Detsky et al. further defined the methodology for the clinical technique to assess nutritional status and named it Subjective Global Assessment (SGA).<sup>2,3</sup> SGA refers to the overall evaluation of a patient by an experienced clinician that correlates the subjective and objective aspects of a medical history and physical examination. Review of the medical history includes an assessment of weight and weight change, dietary intake, gastrointestinal symptoms, disease state, and the patient's functional

status. SGA also includes a physical examination for negative changes in body composition such as loss of subcutaneous fat or muscle wasting, and signs of edema or ascites (nutrition-related). After evaluation, the patient is classified as well nourished (A), mild-to-moderately malnourished (B), or severely malnourished (C).<sup>3</sup>

Detsky and colleagues performed SGA on 202 patients who were hospitalized for gastrointestinal surgery.<sup>3</sup> They found that virtually all of the nutritional assessment variables that clinicians had been taught to use were significantly related to the SGA class into which the patient fit. Multivariate analysis showed that the SGA ratings were most affected by the loss of subcutaneous fat, muscle wasting, and weight loss. Furthermore, those same signs were most significantly correlated with objective measures. These researchers found that SGA was a simple procedure that could easily be taught to a variety of clinicians, and that the technique was reproducible.<sup>3</sup>

Jeejeebhoy et al. define malnutrition as a continuum that begins when a patient fails to ingest enough to meet nutritional needs and progresses through a series of functional changes which precede any change in body composition.<sup>4</sup> They suggest that SGA predicts nutritionally mediated complications, but point out that it could actually be an index of "sickness" rather than nutrition. Proving that SGA is an index of nutrition will require demonstrating that nutrition support can reverse the higher complication rate in SGA "C" patients. These researchers concur that defining malnutrition based on any one change is inappropriate. They conclude that SGA, presently, provides the best clinical way to define the manifestations of malnutrition in relation to clinical objectives.<sup>4</sup>

Jeejeebhoy also found that the state of nutrition alters muscle performance earlier than it alters body composition, and that changes in muscle function correlate with surgical outcomes.<sup>5</sup> These findings support the use of SGA to determine nutritional status since the assessment of muscle function and muscle wasting are important parts of the SGA procedure.

SGA has been successfully used to assess lung transplant patients<sup>6</sup> and liver transplant candidates.<sup>7</sup> Liver disease, like renal disease, affects the interpretation of conventional nutritional assessment parameters. Hasse et al. found that although SGA has some limitations, its use as an alternative test for assessing the nutritional status of adult liver transplant candidates was helpful and had fair-to-good interobserver reproducibility.<sup>7</sup>

Hirsch et al. performed SGA on 127 patients who had been admitted for elective gastrointestinal surgery.<sup>8</sup> They did not find an association between preoperative nutritional status and the incidence of postoperative complications. However, clinicians using SGA had classified only 43% of the survivors as malnourished, but 100% of the patients who died had been classified as malnourished. The patients who died also had greater preoperative weight loss and lower serum albumin levels than the patients who survived the complications.<sup>8</sup>

Hirsch and colleagues also reviewed the results of SGA performed on 175 patients admitted to the medical-surgical service of a general hospital.<sup>9</sup> The SGA was done by both first-year residents and specialists in clinical nutrition, independently of one another. Simultaneous anthropometry was performed, serum albumin was measured, and immune response was tested. Patients rated in the three separate groups of nutritional status had significantly different weight, mid-arm circumference, triceps

skinfold, and serum albumin values. A 79% agreement in SGA classification was found between the residents and the clinical nutrition specialists.<sup>9</sup> These findings validate the interobserver reproducibility, even between clinicians with different professional training, and the correlation with objective measures.

### **SGA and the Renal Patient**

SGA has also been used to assess renal patients. Fenton et al. used SGA to assess the nutritional status of 118 peritoneal dialysis (PD) patients.<sup>10</sup> Patients who were rated as mild-to-moderately or severely malnourished had a significant increase in mortality rate, although these researchers were unable to show that the state of nutrition was an independent risk factor for increased mortality.<sup>10</sup>

Kawaguchi et al. assessed 214 continuous ambulatory peritoneal dialysis (CAPD) patients from eight centers in Japan.<sup>11</sup> SGA indicated that 25% of the male and 27% of the female patients were at least moderately malnourished. In relating the SGA to objective measurements, they found that mid-arm muscle circumference was lower in SGA "B"- or "C"-rated male patients, but none of the anthropometric parameters reflected the SGA nutritional status in female patients. They also found that the serum albumin was low in the SGA "B"- or "C"-rated male patients but not in female patients similarly rated.<sup>11</sup>

Young et al. used SGA as one indicator of nutritional status in PD patients in their international study. They found that approximately 41% of the patients were moderately to severely malnourished.<sup>12</sup>

Enia et al. studied 59 hemodialysis (HD) patients for four months to assess the validity of SGA in renal patients.<sup>13</sup> They were concerned that some features of SGA were influenced by renal disease, independently of malnutrition. They compared SGA with conventional markers of nutritional assessment (albumin and bioelectric impedance). The observers who performed SGA were unaware of the objective measurements. The objective measurements were significantly better in well-nourished ("A"-rated) dialysis patients than in the group of patients who were rated as malnourished. Muscle wasting, loss of fat, and the presence of gastrointestinal symptoms were all closely associated with the final SGA score. Weight loss was also related to the SGA score, but when individual cases were reviewed, as many as nine of 18 moderately or severely malnourished patients had no weight loss, and two others lost less than 2% of their weight. Ankle edema alone was unrelated to SGA score, but when the edema was combined with weight loss, six of the 11 malnourished patients with minimal weight loss had mild-to-severe ankle edema.

Enia's group found that weight loss when considered on its own was sometimes misleading in renal patients. Thus, they recommend assessing weight loss and ankle edema in combination to determine whether or not loss of lean body mass was being masked by extracellular fluid expansion. Their conclusion was that SGA is a "clinically adequate method for assessing nutritional status in dialysis patients."<sup>13</sup>

Cianciaruso et al. used SGA in their cross-sectional comparison of malnutrition in CAPD and HD patients.<sup>14</sup> They assessed the degree to which abnormal SGA findings reflected other parameters of malnutrition in both sets of patients. A low SGA rating

covaried with low visceral protein concentrations, signs of reduced somatic protein stores, reduced body fat stores, and reduced dietary intake. These results were similar for both CAPD and HD patients. They suggest that the SGA technique gives a global assessment of protein-calorie nutritional status in dialysis patients.<sup>14</sup>

The use of SGA as a method to assess nutritional status has been validated in a variety of patient populations, including dialysis patients. The strength of SGA is its subjectivity and the use of the clinician's experience and expertise. As would be expected with any technique, it is prudent to encourage clinicians to use similar criteria on which to base their ratings and to be in agreement as to what would constitute a specific rating.

In the international study by Young et al., investigators discussed the techniques and limitations of both subjective and continuous measurements before the start of the study to minimize variation among centers and clinicians.<sup>12</sup> In Detsky's original study, the clinicians underwent formal training that included a didactic session to review the technique, a review of at least one patient from each category of nutritional status, and a review of at least three additional patients, along with a subsequent check of the ratings by a previously trained rater. In addition, a test of interobserver agreement was performed on all new raters by requiring duplicate ratings of at least 10 patients.<sup>3</sup>

Training is obviously the key to the interobserver reproducibility in the published studies. It is unlikely that clinicians in dialysis units will be afforded the level of training that Detsky or others employed. In lieu of that, it is important for clinicians to understand and agree upon the parameters of the SGA ratings. Ideally, clinicians who will be seeing common patients should discuss and practice the techniques that make up the SGA to be sure that results are reproducible and accurate.

### **SGA Tools and Procedures**

In order to help renal clinicians appropriately utilize SGA, Baxter Healthcare Corporation's Renal Division, in collaboration with K.N. Jeejeebhoy, MD (Toronto, Ontario, Canada), developed a training packet for SGA that includes videotapes, a monograph, and rating forms.<sup>15</sup> The Baxter materials are complete and, after careful review, would allow professionals to perform SGA with confidence. The SGA tools presented with this paper were developed to meet the specific needs of the Satellite Dialysis Centers' (SDC) clinicians and facilities. They were compiled from information in the literature and in the Baxter training packet.

### **The Medical History**

The procedures of SGA as described by Detsky et al. include two major divisions, the medical history and the physical examination.<sup>3</sup> The medical history is comprised of five distinct features: The first is a review of the patient's weight history over the previous six months. Any weight change is expressed as both actual loss and the proportionate percentage lost. A loss of  $\leq 5\%$  is considered a normal variation and insignificant. A loss of between 5% and 10% is considered potentially significant, and a sustained loss of  $>10\%$  is definitely significant.

The rate of weight loss and the pattern of loss are also important. For example, it is possible for a patient who has had significant weight loss to be rated as well nourished if that patient's weight has recently stabilized or increased. This well nourished or "A" rating is based on improvement in status. However, a patient who may have lost an equal amount of weight may be considered malnourished if the weight loss is ongoing and/or there has been a recent significant loss.<sup>3</sup>

The second aspect of the SGA is a historical review of dietary intake, including a comparison of the patient's usual and recommended dietary intake to current intake. If the intake is judged to be abnormal for that specific patient, the clinician notes the degree and duration of the abnormality. The abnormal intake can be rated as suboptimal, full liquid, hypocaloric liquids, or starvation.<sup>3</sup>

A third feature of the history is questioning the patient to determine if he or she is experiencing any significant gastrointestinal symptoms such as anorexia, nausea, vomiting, and/or diarrhea. For the gastrointestinal symptoms to be considered significant, they should have been present on an almost daily basis for at least two weeks. Short-term or intermittent symptoms are not considered significant.<sup>3</sup> It is critical to use detailed questions and to interview the patient carefully to obtain accurate responses. Some chronic renal failure patients, for instance, feel as if they are sick all the time. It is important to ask questions in a way that helps them quantify the degree, frequency, and duration of their symptoms.

A standard questionnaire may be helpful to ensure that questions are asked consistently. At SDC we are testing a patient questionnaire to gather the historical data for SGA (see [Figure 1](#)). Thus far, patient-completed questionnaires have been comparable to those that were completed by the dietitian. Obviously, not every patient will be able to complete the questionnaire independently.

The fourth aspect of the SGA history is the patient's functional status or energy and activity levels.<sup>3</sup> It is important to view this information as compared to the patient-specific normal levels. The clinician must note only those changes in function that are related to nutritional status. Obviously, a change in functional status secondary to arthritis would not be related to nutritional status. On the other hand, muscle wasting that makes it difficult for a patient to rise from a chair would be considered a nutrition-related functional change. Again, it is important to know the patient's baseline level of function in order to assess the change and its significance.

The final aspect of the history, as outlined by Detsky et al., is to evaluate the metabolic demands of the underlying disease state and any acute stresses that may alter those metabolic demands. An example of a high-stress disease is ulcerative colitis with daily, bloody diarrhea, whereas a "smoldering infection or malignancy" would be considered a low-stress disease.<sup>3</sup> Complications in renal patients, such as peritonitis, can increase metabolic needs by more than 50%. Common acute stresses (infection, fever, peritonitis) may increase the risk for the development of nutrient deficiency; thus, they should be noted in the SGA.

## **The Physical Examination**

The second major division of the SGA is the physical examination. The physical examination is comprised of assessment for loss of fat stores, muscle wasting, edema, and ascites. Each of these areas is rated as normal (0), mild (1+), moderate (2+), or severe (3+).<sup>3</sup> The features of the physical examination are summarized in [Figure 2](#).

Detsky's assessment for loss of subcutaneous fat centers on the triceps and mid-axillary line at the level of the lower ribs.<sup>3</sup> SGA training materials developed by Baxter Healthcare suggest including an assessment of the biceps and the fat pads under the eyes.<sup>14</sup> The evaluation of subcutaneous fat is not meant to be an exact measurement; rather, it should provide an overall subjective impression of the patient's fat stores and losses that may have resulted from inadequate nutrition.

Muscle wasting is defined as a loss of bulk and tone. Detsky's group suggests that the temple, quadriceps, and deltoids are appropriate sites to evaluate the patient for signs of muscle wasting.<sup>3</sup> The Baxter materials include an assessment of the temples, clavicle, shoulder, ribs, scapula, knee, calf, quadriceps and interosseous muscle to determine the degree of muscle wasting.<sup>14</sup> Prominent bone structure and flat or hollow areas suggest muscle wasting. Detsky cautions that any neurological defect can interfere with this assessment.<sup>3</sup>

The last aspect of the physical examination is the determination as to whether there is edema or ascites. Again, the clinician is urged to rate only that edema or ascites that seems to be related to malnutrition.<sup>3,13</sup> Baxter suggests that assessment for ascites is applicable only with hemodialysis patients since the dialysate in the peritoneal cavity could mimic ascites.<sup>15</sup> The determination of nutrition-related edema and ascites is more difficult in dialysis patients since their fluid balance can vary greatly from day to day. Any evaluation of edema or ascites should be performed after the dialysis treatment when the patient is at estimated dry weight.

### **Determining Nutritional Status**

Once the history and physical examination are completed, the clinician can make a determination of the patient's nutritional status. The SGA rating is based on subjective rather than numerical weighting. It is important to recognize that much of the value of the SGA is in the detailed, historical perspective that it provides on each patient. The actual rating may be of secondary importance over the long term of monitoring the patient.

In Detsky's study, raters were instructed to place the most emphasis on weight loss, poor dietary intake, muscle wasting, and loss of subcutaneous fat. The other aspects of the SGA were considered to be a way in which the clinicians could confirm their primary findings.<sup>3</sup> This instruction seems appropriate for the use of SGA in renal patients if the findings of Enia et al. are noted. They found that as many as 50% of their malnourished patients had little or no absolute weight loss. In renal patients, it is critical that weight change and edema be assessed in tandem in order to determine if tissue wasting is being masked by fluid retention.<sup>13</sup>

Reviewing the parameters and techniques of SGA is critical when more than one clinician will be evaluating common patients. At SDC, there are 10 facilities, 15 dietitians, and 8 home training coordinators (nurses) who are potentially involved

with SGA. In an effort to ensure that SDC clinicians are using the same standards and techniques, the following five tools were developed:

- A standard questionnaire (which can be completed by the patient or clinician; see [Figure 1](#)).
- A schematic of the body to show the points of examination for the physical assessment.
- A summary of the features and findings for each level of nutritional status in the physical examination (see [Figure 2](#)).
- A guideline to summarize how a patient might be rated based on findings, changes, deterioration, or improvement in each aspect of the SGA (see [Figure 3](#)).
- A rating form, which was designed to become a part of the SDC permanent medical record (see [Figure 4](#)).

Past experience at SDC has shown that training and common technique can improve the reliability and accuracy of measurements such as arm anthropometrics. The SDC tools were developed to ensure that the SGA is being performed in a like manner by all clinicians so that results are comparable among clinicians and facilities. The accuracy, reproducibility, and consistency of the SGA should be improved by using initial standard training, specific procedures, and an ongoing review of the procedures and results. We have laminated the SDC tools to allow our clinicians to use them as an easy reference during performance of SGA. They are shared here for other clinicians to adapt to their specific facility needs and standards.

## **Discussion**

SGA does not replace formal nutritional assessment methods; rather, it is used in conjunction with them. It can be used in a number of ways with renal patients (either pre-ESRD, ESRD, or transplant patients) and may be especially helpful to those dietitians who have been given inadequate time to care for the complex nutritional needs of their patients. As a screening tool, SGA can differentiate between the patients who need immediate and aggressive nutritional intervention and those who need minimal intervention. SGA can quickly identify those patients who are most at risk for malnutrition or whose status is declining, allowing patient care to be prioritized. Prioritizing patient care can, in turn, help ensure that professional staff time is used efficiently.

SGA takes very little time once the clinician is acquainted and comfortable with the procedure. If time is an issue, the dietitian and nurse can approach SGA as a team, dividing the workload appropriately. SGA is considered an inexpensive method of nutritional screening that can be performed frequently.<sup>13</sup> The expense is limited because SGA is based on the history and physical examination rather than on costly laboratory tests or more time-consuming formal anthropometrics. Performance and documentation of the SGA provides the clinician with an easily accessible, detailed historical record of factors that may influence the status of the patient. This record can be invaluable in the development of a care plan that is specific to individual patient needs and circumstances.

SGA can also be used as a continuous quality improvement (CQI) measure. It can serve as a baseline measure of nutritional status, as an ongoing monitor of status

changes, and can be used to document response to therapy or to drive changes in nutrition care maps.

Subjective global assessment is a simple assessment method that utilizes the experience of a clinician to subjectively rate a patient's nutritional status based on the medical history and physical examination. SGA focuses away from a single-point assessment and forces the clinician to look at a broader picture of the patient. It has been validated in comparison to objective measures of nutritional status and in a variety of patient populations. The reproducibility of SGA ratings is dependent upon the use of consistent procedures and a common basis for those ratings. The training materials noted here can be further tested and refined to help in that process. The benefit of performing SGA goes beyond the nutritional rating. As the use of SGA increases, its value and applications are sure to expand as well.

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