

**E-TABLE 68-1** COMPREHENSIVE NUTRITIONAL ASSESSMENT OF MEDICAL AND SURGICAL PATIENTS

1. Review past medical and surgical history and current illness
  - a. Degree of catabolic stress (e.g., fever, infections, sepsis, surgeries, lung failure)
  - b. Organ function (e.g., liver, kidneys, lung, heart/vascular, GI)
  - c. Use of medications that may decrease nutrient absorption (e.g., phenytoin, sulfasalazine, elixir-based medications), alter metabolism or utilization (e.g., warfarin, isoniazid, methotrexate), or increase excretion (e.g., gentamicin, loop diuretics)
  - d. Recent intravenous fluid and electrolyte therapy
  - e. Medical and surgical procedures that are likely in the near term
  - f. Hemodynamic status and requirements for pressor agents to maintain blood pressure
2. Obtain body weight history
  - a. Current body weight (dry weight if available preoperatively or from a recent clinic visit) + usual body weight when healthy or clinically stable; calculate % body weight loss from usual body weight over the last several weeks or months
  - b. Calculate current weight as % of ideal body weight\*
  - c. Determine BMI (weight in kg divided by square of height in m); BMI <18.5 is considered underweight
3. Determine dietary intake pattern in relation to nutrient needs
  - a. General food and beverage intake pattern, % of usual dietary intake consumed in recent weeks and months, unusual or excessive consumption of specific foods or beverages (including alcoholic beverages)
  - b. Previous use and type of enteral tube feedings or parenteral nutritional support
  - c. Previous use of liquid or solid nutritional supplements, multivitamin-multimineral preparations, specific vitamins or minerals
  - d. Consult registered dietitian for more detailed nutrient intake assessment
4. Perform detailed physical examination
  - a. Skeletal muscle wasting (cannot be assessed accurately in overweight or obese patients)
  - b. Loss of body fat stores
  - c. Presence and qualities of wounds
  - d. Skin, hair, tongue, and conjunctival lesions suggestive of micronutrient deficiency (see E-Table 68-2)
  - e. Evidence of organ dysfunction (GI, liver, renal, cardiopulmonary)
  - f. Fluid status (e.g., normal, dehydrated, fluid overload, capillary leak); daily fluid requirements are typically 30-40 mL/kg body weight
5. Evaluate GI tract function
  - a. Swallowing or chewing difficulties, nausea, emesis, abdominal pain
  - b. Intestinal ileus, motility disorders, partial or complete obstruction
  - c. Diarrhea history (frequency, amount, other characteristics)
  - d. Acute or chronic GI bleeding
  - e. Presence of fistulas; history of recent abdominal surgery
  - f. Drainage tube losses (e.g., gastric, biliary, intestinal, peritoneal)
6. Determine functional status
  - a. Ability to perform daily activities, ambulatory capacity, bedrest, chemical paralysis
  - b. History or physical examination evidence of muscle weakness and fatigue
  - c. Mental capacity, history of psychiatric disorders that may preclude oral food intake
7. Serial evaluation of selected biochemical tests
  - a. Standard blood measures of organ function
  - b. Electrolyte concentrations (e.g., calcium, magnesium, phosphorus, potassium)
  - c. Blood pH (in ICU patients on mechanical ventilation)
  - d. Blood triglyceride concentrations (in patients receiving intravenous lipid emulsion)
  - e. Blood concentrations of selected vitamins and minerals if suggested by medical or dietary history, physical examination, or underlying illness (e.g., zinc, selenium, copper, thiamine, vitamin B<sub>6</sub>, vitamin B<sub>12</sub>, folate, 25-hydroxyvitamin D, iron, ferritin)
  - f. Serum prealbumin (in stable outpatients)<sup>†</sup>
8. Estimate caloric (kcal), protein and micronutrient needs
  - a. Caloric needs are based on the Harris-Benedict equation<sup>‡</sup>, guidelines on kcal/kg body weight<sup>§</sup>, or indirect calorimetry results (use serially in ICU patients and in the initial assessment of very underweight or obese hospital patients requiring prolonged nutritional support)
  - b. Protein needs vary as a function of recognized clinical situations (see E-Table 68-3)
  - c. Vitamin and mineral needs are based on conventional requirements, serial blood levels, and clinical judgment regarding intake and estimated losses from comprehensive nutritional assessment
  - d. Nitrogen balance studies are not useful in nonresearch settings because of their variability and inaccuracy
  - e. Serial body composition measurements for lean body mass and body fat estimates may be useful in the outpatient setting (by BIA or DEXA) but are not practical or reliable in inpatient nonresearch settings because of fluid shifts and other factors
9. Evaluate enteral and parenteral access for nutrient delivery
  - a. Ability to take oral diet and/or liquid supplements
  - b. Central venous or PICC line access; peripheral line access
  - c. Nasogastric, nasoenteric, or percutaneous feeding tube availability or feasibility
10. Consultation with multidisciplinary nutrition support team

BIA, Bioelectrical impedance analysis; BMI, body mass index; DEXA, dual energy x-ray absorptiometry; GI, gastrointestinal; ICU, intensive care unit; PICC, peripherally inserted central venous catheter.

\*Ideal body weight can be estimated in men as 48 kg (106 lb) per 5 ft of height + 2.7 kg (6 lb) for each inch of height above 5 ft and in women as 45 kg (100 lb) per 5 ft of height + 2.3 kg (5 lb) for each inch of height above 5 ft.

<sup>†</sup>Blood concentrations of albumin and prealbumin in hospitalized patients, especially in the ICU setting, are markedly affected by non-nutritional factors (e.g., inflammation, infection, fluid status, capillary leak, decreased hepatic synthesis, increased clearance from blood).

<sup>‡</sup>Harris-Benedict equation to estimate basal energy expenditure (BEE) in kcal/24 hr: for males, BEE = 66.5 + (13.8 × kg body weight) + (5.0 × height in cm) - (6.8 × age in years); for females, BEE = 655 + (9.6 × kg body weight) + (1.8 × height in cm) - (4.7 × age in years).

<sup>§</sup>Caloric needs can also be estimated as follows (using dry weight or ideal body weight in ICU patients with fluid overload): in ICU settings, 20-25 kcal/kg/day (some studies suggest that 15-20 kcal/kg/day or lower may be appropriate); in non-ICU settings, 25-35 kcal/kg/day.

