

## **Nutrition in HIV Disease**

***excerpt from HIV Medication-Food Interactions Handbook 2<sup>nd</sup> Edition  
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The advances of potent life-prolonging medications, used in highly active antiretroviral therapy (HAART), has made HIV a chronic manageable disease with an increased need to focus on nutritional concerns. Because nutritional status impacts the effective management of HIV disease, the importance of optimal nutritional status can not be overstated. Maintenance of appropriate body stores and function becomes a central issue.<sup>45</sup> Medication side effects increase the need for effective nutritional therapy. Among the current problems seen in long-term management are wasting processes, side-effects and symptoms associated with medication therapies, altered metabolic processes, and changes in physical attributes of the body. To address these problems it will be essential to understand the process of nutritional compromise and its effects on disease management.

Early and successful management of HIV infection will affect the type of nutrition-related problems. One schematic of methods for categorizing and addressing nutrition-related problems is the HIV-specific Medical Nutrition Therapy (MNT) protocols published by the American Dietetic Association.<sup>94, 95</sup> These protocols along with other strategies for evaluation and management of disease and nutrition-related complication can help to standardize nutritional care. The goals of MNT include strategies to:

- \* Maximize the effectiveness of medical and pharmacological treatments
- \* Prevent the development of specific nutrient deficiencies
- \* Optimize nutrition status, immunity and overall well being
- \* Prevent and manage medication side effects
- \* Prevent loss of body weight, lean body mass and other facets of malnutrition
- \* Minimize health care costs

Baseline evaluation and care includes a nutrition risk assessment and nutrition education. Nutrition education should include basic food principles, food safety issues, strategies for prevention and reversal of weight and muscle tissue loss and potential food medication interactions. Nutrition risk screening includes a review of the risk factors and indicators of nutritional compromise. Criteria generally include food-related habits and access to food, weight and body composition changes, medical profile (infections, injuries,

medications), use of complementary therapies and "recreational" drugs. Assessment parameters are discussed in the assessment section on page 195.

## **Body Composition**

Multiple medication regimens may have effects such as GI upset, diarrhea, nausea, vomiting, malabsorption and/or anorexia that negatively affect the patient's ability to eat an adequate diet. These effects, combined with depression, apathy, fatigue and/or financial restrictions, often lead to a specific form of malnutrition called HIV or AIDS related wasting syndrome. Because of the important role played by lean tissues to support life processes, medication and other therapies, the loss of lean tissues is a major concern. Even asymptomatic patients may experience muscle wasting and significant clinical problems due to disease processes, symptoms, and malabsorption of nutrients<sup>31</sup>, despite decreased viral load and improved immune function as a result of HAART.<sup>75</sup>

Some data suggest that as little as 3% to 5% loss of weight from baseline over a 4 month period increases the risk of opportunistic complications and death.<sup>90</sup> Involuntary weight loss of more than 5% within 6 months or 10% within 12 months is increasingly regarded as an acceptable criterion for wasting. If one can anticipate the potential for weight loss and wasting, prevention and effective treatment of nutrition-related problems may be accomplished.

HIV disease and its complications deplete nutritional stores as a result of the body's normal response to infection, therefore causing nutrition related problems. When weight alone is used as the only criteria for the wasting process, this may underestimate the degree of tissue and functional losses. Metabolic stress responses cause catabolism of protein stores to provide energy and enhance the amino acid pool. Fluid shifts also occur, increasing fluids outside of cells while intracellular fluid associated with protein stores is depleted. HIV does not appear to become dormant and provides a continuous message to the body to respond. Even with medication, the virus may establish a "set-point" and reproduce as much as necessary to maintain that level of viral load. This continuous assault may require adaptation by the body to tolerate and survive the effects of the virus. For instance, if muscle stores are compromised, the body may adapt by lowering energy levels thus causing chronic fatigue.

Bioelectrical impedance analysis (BIA) is used to evaluate body composition. BIA measures the body's electrical properties. Using

these measurements, we can estimate muscle and other lean tissue, fat and water. BCM (body cell mass), ECT (extracellular tissue), FFM (fat free mass), TBW (total body water), extracellular and intracellular water and fat compartments. The FFM compartment can be broken down to BCM and ECT. BCM is most associated with survival and is primarily made up of muscles and organs, which process nutrients and medications. The ECT compartment is comprised of structure and transport tissues (such as bone, collagen and fluids outside of BCM). Phase angle is calculated and appears to reflect the ratio of body compartments.

Body composition evaluation through anthropometry and BIA is further discussed in the assessment section on page 195. Periodic BIA has been used to evaluate the efficacy of medical, nutritional and other therapies, such as appetite stimulant(s), anabolic medications and fitness programs. BIA can help to determine the need for additional evaluation such as hormonal levels and anticipates compromises in body functions. Unfortunately, weight loss in HIV is often protein loss, while gain may be largely fat, but little muscle restoration. BIA can help to determine these body changes and help medical professionals redesign various aspects of the health care plan including diet, fitness programs, medication or additional laboratory testing such as testosterone levels.

## **Nutrients And HIV**

Continuous assault of HIV viral load and disease complications may deplete the body of nutrients and deficiency syndromes may develop. Hypermetabolism and metabolic dysfunction occur causing inefficient nutrient metabolism. Studies have demonstrated that HIV infection increases the risk of developing deficient serum levels of beta carotene, and the vitamins riboflavin (Vit B<sub>2</sub>), folic acid, retinol (Vit A), pyridoxine (Vit B<sub>6</sub>), cobalamin (Vit B<sub>12</sub>), ascorbic acid (Vit C) and tocopherol (Vit E). Deficient serum levels of the minerals iron, magnesium, selenium, copper and zinc are also common in HIV-positive patients. Micronutrient deficiencies are sometimes evident even in the early stages of HIV infection and may contribute to disease progression.<sup>99</sup> Rather than individual nutrient supplements, a complete multivitamin-mineral supplement that provides 100% to 200% of the RDAs is suggested. Some clinicians routinely suggest a vitamin B complex and antioxidant formula as well.<sup>99</sup>

## **Metabolic Abnormalities and Altered Fat Distribution (Lipodystrophy syndrome)**

Abnormal body shape and body fat distribution, low serum testosterone concentration, high serum cholesterol and triglycerides, insulin and other hormonal resistance, (often referred to as lipodystrophy syndrome) is a newly recognized complication in long-term survivors of HIV disease. These metabolic abnormalities add to the difficulty of managing HIV infection<sup>110, 111</sup> see p 22. Changes in body dimensions include both the loss of subcutaneous fat stores in peripheral limbs, face, buttocks, and elsewhere and the deposition of fat in the body trunk areas including the visceral region of the abdomen, back, neck, and flanks. Preliminary studies showed that patients with buffalo humps may have lower HDL concentrations than those without humps.<sup>115</sup> This needs further evaluation, however, because HIV infection itself leads to decreased HDL concentrations.

Resistance training along with aerobic exercise may help to reduce total body fat and trunk fat.<sup>116</sup>

If possible, HIV-positive people should enlist the help of a fitness trainer who is knowledgeable about HIV/AIDS to design an exercise program that matches their fitness level and medical status. Additional medications, such as sex hormones, growth hormone, antidiabetic and antihyperlipidemic drugs have been empirically used in an effort to reduce the effects of altered fat deposition.<sup>110</sup>

Heart disease and diabetes that can occur with the use of HAART must be addressed with effective nutrition and medication therapy.<sup>105, 111</sup> Dietary modification may be most helpful to treat very high triglyceride levels, since extreme elevations are related to circulating chylomicrons whose fat is of dietary origin.<sup>110</sup> If medication is also necessary to control lipid and/or glucose levels, the clinician should monitor for drug interactions and additional potential for the compromise of nutrition status.

## **Fad Diets**

Some HIV-positive people may follow harmful fad diets with the hope of improving nutrition status. Diets such as the popular high protein regimen are not recommended without close dietitian supervision because they usually increase saturated fat intake, cause excessive work for the kidney and liver, and may lead to heart disease, kidney stones, and an increased risk for osteoporosis.<sup>114</sup> Since stored carbohydrate contains large amounts of water, which is eliminated when dieters switch to a low carbohydrate diet, these regimens can also result in the loss of both water and the weight associated with it.

## Medication Issues

Recent focus on drug-drug interactions, drug interactions with food, food components or dietary supplements and the effects of phytochemicals on P450 enzyme activity has caused both clinicians and HIV-positive people to restructure medication scheduling strategies. In addition to medications to combat and manage HIV infection, many patients also take medications for symptom management or nutritional rehabilitation. Symptom management strategies (see also MNT section p 22) are typically aimed at supporting tolerance and effectiveness of drug therapies as well as quality of life. Nutrition rehabilitation includes nutrient support, exercise, antiretroviral therapy (which requires strict adherence to drug regimens<sup>112</sup>), prevention and treatment of other infection and/or neoplasm, and immune function restoration.

The effectiveness and tolerability of some drugs can be affected by the body's nutritional stores. The overall bioavailability and efficacy of a drug can be influenced by an individual's plasma protein concentration (as in the case of a highly protein-bound medication) and by the drug's volume of distribution. Both factors are affected by nutritional status. Information about the actual incidence and severity of food medication interactions is incomplete at this time, especially with many of the newly approved drugs. Consideration of these interactions, as well as drug-drug (see p139) and drug-herbal (see p 220) interactions, is an important part of a multi-faceted health care plan.

Medications used to try to restore positive nutritional status include vitamins, minerals, appetite stimulants such as megestrol acetate (Megace) or dronabinol (Marinol), anticytokine therapies such as thalidomide (Thalomid) and anabolic therapies (such as growth hormone or anabolic steroids). Choosing to prescribe, recommend or use these drugs should be part of a care plan for prevention and treatment of nutritional compromise. Combinations of therapies are likely to be more effective in some cases, such as the use of megestrol acetate with anabolic agents and resistance exercise.<sup>113</sup>

## Value of MNT (Medical Nutrition Therapy)

MNT to maintain or improve nutritional status is a necessary part of the management of HIV disease. Individualization of fluid, calorie, protein and other nutrient needs with respect to and consideration of cultural aspects, current food habits, nutrition-related beliefs and medical status may determine the patient's ability to manage his/her disease. Successful treatment of wasting syndrome, altered

fat distribution and metabolic abnormalities improves not only the patient's medical status, but also self esteem and willingness to continue to fight the effects of HIV.

In the MNT section, (p 22) we present MNT to alleviate adverse nutrition-related effects of HIV. These suggestions may not work for all patients. The suggestions may work for particular patients for a while and then fail. New therapies may be tried with short-term success. It can be very frustrating and tedious for both the patient and the health care provider to continually adjust strategies.

Ultimately, the goal is to provide HIV -positive people with the best options for disease management to improve the length, quality, and productivity of their lives.