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NUTRITION MANAGEMENT OF THE CHILD WITH HIV INFECTION

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OVERVIEW OF PEDIATRIC HIV INFECTION IN THE UNITED STATES

Acquired Immunodeficiency Syndrome (AIDS) has become the ninth leading cause of death in the United States among children between the ages of 1 and 4 years. By 1997, 7629 cases of AIDS in children under the age of 13 were reported in the United States¹. Perinatal transmission accounts for not only 90% of all cases of AIDS in this age group but is also the cause of virtually all new cases of HIV infection in infants. It is estimated that 5000 HIV-infected infants were born in the United States from 1995 through 1997. Some good news is that perinatal transmission rates have been reduced from 22.6% to 7.6% since zidovudine is administered to pregnant women with HIV infection².

There are two general patterns of presentation of HIV infection in children. The first pattern, seen in about one third of all perinatally acquired infection, is represented by the early onset of severe disease in infants with rapid progression and poor prognosis. The children with early onset of disease manifestations die by the age of 4 years. The second pattern of pediatric HIV infection, representing the other two-thirds of children with the infection, involves later onset of disease symptoms

and is associated with a better prognosis. As medical care has improved, life expectancy and quality of life have improved. Unlike a decade ago, HIV is now more often considered a chronic disease versus an imminently terminal disease.

Due to the complex nature of HIV, the nutrition management varies dramatically. Pediatric HIV is complex because there is multi-organ system involvement. For example, you may see two children in the waiting area, one who has an opportunistic infection but is playing, talking, and getting into things, and another who is non-ambulatory with severe neurologic deficits. Both children are HIV infected and are immunosuppressed but the virus has invaded the brain of the child who is non-ambulatory. As in adults, HIV disease in infants and children appears with a broad spectrum of manifestation. However, some manifestations are unique to children.

Table 1, on page two, summarizes the classification system for children with HIV, lists clinical symptoms and provides the immunologic categories. The present Center for Disease Control (CDC) classification system considers both the immunologic and clinical criteria. Clinical symptoms vary widely and range from common, nonspecific findings to severe manifestations of

Editor's Note – This is the first of a two-part article discussing nutrition issues for children with Human Immunodeficiency Virus (HIV) infection. In this article the author reviews the history of HIV infection in children, the types, nutrition assessment and intervention and presents several cases to illustrate the both the complexities of this disease and the need for an individual approach to nutrition care. The March/April issue will present day to day nutrition management issues related to the care of a child with HIV infection.

A note about the use of the terms HIV and AIDS—An individual who is HIV-infected does not necessarily have AIDS. However if an individual has AIDS they are HIV infected. That is why the term HIV infected covers all people. AIDS is not scientifically accurate to use for all HIV-infected persons. The term AIDS was developed by the CDC to capture symptoms of a new syndrome.

Author's Comment - At the Francois-Xavier Bagnoud Center (FXB) in Newark, care is provided for approximately 200 HIV infected children ranging in age from birth to twenty years. Care is multidisciplinary including physicians, nurse practitioners, nurses, social workers, a psychologist and a nutritionist.

James Oleske, MD and Mary Boland, RN, MSN founded FXB. Dr. Oleske was one of the physicians who first discovered the virus in children. FXB provides medical care, domestic and international professional training programs, and conducts extensive pediatric HIV research. The families who come for care are primarily from the Newark area. Many of the families are impoverished, and about half the children live in foster care or with a relative due to parental death.

The registered dietitian (RD) provides nutrition care on a monthly basis and may see children with HIV and their families for years. Nutrition intervention may change often since HIV is progressive.

Table 1 - Classification System for HIV Infection in Children (<13 years of Age)*
Clinical Categories with Associated Symptoms

	N: no signs / symptoms may have one from A	A: Two or more of the following not in B or C	B: Moderate signs/symptoms†	C: Severe signs/symbols‡
<p>The system uses both the degree of immune suppression (which varies with age) and the symptoms associated with clinical categories to classify the degree of illness.</p> <p>Immunologic Categories - Based on Age Specific CD4+Lymphocyte Count and Percentage</p>		<p>Signs/symptoms Lymphadenopathy Hepatomegaly Splenomegaly Dermatitis Parotitis Recurrent/ persistent: URI OM Sinusitis</p>	<p>Signs/symptoms Anemia Neutropenia Thrombocytopenia One Bacterial Infection Oral Candida (>2 mos) Cardiomyopathy Cytomegalovirus (CMV <1mo of age) Diarrhea Hepatitis Herpes Simplex Complex (HSV) Herpes Zoster (H Zoster) Leiomyosarcoma Lymphoid Intestinal Pneumonitis (LIP) Nephropathy Nocardiosis Persistent fever Toxoplasmosis (<1 mo of age) Varicella, disseminated</p>	<p>Signs/symptoms Bacterial Infections (2 in 2 years) Candidiasis Cryptococcosis Cryptosporidiosis Cytomegalovirus (CMV >1 mo old) Encephalopathy Herpes Simplex Complex (HSV) (ulcer >1 mo) Histoplasmosis Kaposi's Lymphoma Mycobacterium tuberculosis (MTB disseminated) Mycobacterium avium intracellular (MAI and MAC) Pneumocystic Carinii Pneumonia (PCP) Progressive Multifocal leukoencephalopathy (PML) Toxoplasmosis Wasting Syndrome (FTT)</p>
	<p>Category 1 - No suppression (values above these are normal)</p> <p><i>Child's Age</i></p> <p><12 months ≥1,500/mm (≥25%) 1-5 years ≥1,000/mm (≥25%) 6-12 years ≥500/mm (≥25%)</p>	N1	A1	B1
<p>Category 2 - Moderate immune suppression</p> <p><i>Child's Age</i></p> <p><12 months 750-1,499/mm (15-24%) 1-5 years 500-999/mm (15-24%) 6-12 years 200-499/mm (15-24%)</p>	N2	A2	B2	C2
<p>Category 3 - Severe immune suppression</p> <p><i>Child's Age</i></p> <p><12 months <750/mm (<15%) 1-5 years <500/mm (<15%) 6-12 years <200/mm (<15%)</p>	N3	A3	B3	C3

*Adapted with data from: Center for Disease Control and Prevention (1994). 1994 Revised Classification System for Human Immunodeficiency Virus Infection in Children Less than 13 Years of Age. Morbidity and Mortality Weekly Report, 34 September 30, 1994 Vol. 43# (RR-12), 1-18.

†Both Category C and lymphoid interstitial pneumonitis (LIP) are reported as AIDS to state and local health departments.

the disease. Immunologic categories are based on age specific CD4 T-lymphocyte counts and percentages. It is important to become familiar with the classification system so that nutrition management can be individualized according to symptoms and organ system involvement.

The medical management of children with HIV includes:

- 1) regular immunologic monitoring with CD4+ T-cell counts and percentages *Note: CD4 is the molecule on the surface of a cell that identifies a T-lymphocyte or T-helper cell. This is the cell that the virus attacks - the CD4 T Lymphocyte. The number of CD4 T lymphocytes are measured to see how much damage the virus has done*
- 2) regular virology monitoring
- 3) HIV-specific pharmacology
- 4) prevention and treatment of infections, both bacterial and opportunistic
- 5) general supportive management - nutrition care falls within the general supportive management category.

NUTRITION IMPLICATIONS

Pediatric HIV infection frequently results in nutritional deficiencies and growth failure. In general, linear growth and weight gain in children with HIV are significantly reduced early in life³. Many studies have shown that poor nutrition alone can have a negative impact on the host's immunologic response⁴. Malnutrition has also been proposed as a cofactor of immune dysfunction in HIV infection and has been recognized as a cause of increased morbidity and mortality in HIV infection⁵. Vitamins and minerals which have been identified to be involved in immune system function include vitamins B6, E, and C, beta-carotene, folate, selenium, and zinc.

The reasons for growth failure are multifactorial and are primarily related to the underlying pathologic disease process. Progressive weight loss is often associated with gastrointestinal disease due to destruction of the villi from the virus residing on the gut wall and/or bacterial or opportunistic infections that cause abdominal pain and diarrhea. Intestinal dysfunction often results in

carbohydrate and fat malabsorption as well as protein loss. Other organ system involvement such as encephalopathy, cardiac disease, nephropathy, oncologic disease, and hematologic disease can also have significant bearing on nutritional status. Micronutrient deficiencies have also been identified as a possible explanation for growth failure in pediatric HIV infection⁶.

Psychosocial, behavioral, and environmental problems can also influence growth patterns and nutritional status. Children are at high risk for experiencing psychological difficulties due to social isolation, family illness, disruption of daily life and parental death. Behavioral problems are also common and many times manifest themselves in eating and mealtime difficulties. Food availability, housing and food preparation facilities, and parental substance abuse can also impact negatively on a child's mental and physical health. The case studies at the end of the article illustrate some of these issues.

Cachexia, the preferential loss of lean body mass, associated with HIV infection, has been described in both children and adults³. Cytokines are produced as a metabolic response to injury. Cytokines are chemical messengers that are released as a metabolic response to acute injury or infection. Examples are interleukin-1 (IL-1), interleukin-6 (IL-6) and tumor necrosis factor. This accelerated protein catabolism and gluconeogenesis of injury is, up to a point, an advantageous response to meet increased metabolic demands. Since HIV infection is a constant viremic condition, the net affect of cytokines is the nonproductive use of substrates and muscle wasting.

This cachectic response is also associated with reduced clearance of triglycerides by lipoproteins. Investigators theorize that a decrease in clearance of triglycerides would lead to an inability to utilize fats as a reserve source of energy, with consequent wasting of lean body mass⁷. In addition, the incidence of lipodystrophy has increased since children have started on highly active antiretroviral therapy (HAART). This lipodystrophy is characterized by

peripheral fat wasting with concurrent visceral truncal obesity, dorso-cervical hump (a "buffalo" hump or accumulation of fat behind the neck), hypertriglyceridemia, hypercholesterolemia, and insulin resistance or hyperglycemia.

NUTRITIONAL ASSESSMENT

Nutrition assessment begins with a nutritional history from the caregiver and/or the child, when age appropriate. As a part of the assessment, the registered dietician (RD) should be aware of the child's disease classification and specific symptoms (Table 1) since intervention varies depending on diagnoses. Table 2 lists topics to explore as part of the nutrition assessment and suggests intervention strategies which are based on the assessment related to the child's clinical category and symptoms.

Anthropometric assessment includes plotting the child's height and weight on an NCHS growth chart. Other markers used for assessment of growth include z-scores (standard deviation measurement), and incremental growth velocities. Several classification systems are available to assess and classify growth and weight gain⁷. Table 3 lists the Waterlow, Gomez and Kanawati and McLaren criteria. (See Case Study #2)

Measurements of body composition may reflect nutrition status more accurately than standard weights. Skinfold measurements such as triceps skinfold and subscapular skinfold are an accessible and inexpensive tool for measuring body composition as long as the practitioner is trained to accurately and consistently perform the procedure. Bioimpedance analysis (BIA), used in the prediction of total body water and free fat mass, is becoming more commonly used. Dual x-ray absorptiometry (DEXA) is also used for clinical trials and to validate other body composition methods.

Evaluation of laboratory data includes regularly assessing hemoglobin and hematocrit along with red blood cell indices, albumin (prealbumin and serum retinal-binding protein levels), and serum ferritin if anemia is present.

Table 2 – Nutrition Assessment and Intervention in Children with HIV Infection Based on Clinical Categories

Assessment - Review these nutrition assessment components for all children with HIV

- Anthropometric data (length/height, weight and body composition data)
- Laboratory data related to individual child's condition
- Nutritionally significant medications
- Developmental age of the child with assessment of the child's feeding skills and abilities
- Appetite of the child including hunger and satiety cues
- Food intake for child including an evaluation of energy and nutrient intake – various methods can be used including diet history, 24 hour recall and/or food frequency
- Family's food access and availability
- Social history
- Behavioral issues related to feeding for child/caregiver
- Cultural practices which influence food selection, service and feeding in the family
- Child's dental health
- Supplement use including vitamins, minerals, nutrition supplements and alternative nutrition therapies (e.g. herbals)
- Child's activity level
- Food allergies
- Child's disease classification and specific symptoms

Intervention - Interventions for Specific Clinical Categories in Children with HIV Infections

Clinical Category	N: No Signs/Symptoms and A: Mild Signs/Symptoms	B: Moderate Signs/Symptoms	C: Severe Signs/Symptoms
I N T E R V E N T I O N S	<ul style="list-style-type: none"> • Calories and protein: 1.5-2 times RDA if growth velocity is not appropriate for age • Select nutrient dense diet • Use a multivitamin with minerals • Increase food access • Reduce caffeine intake • Promote feeding development • Consider use of meal psychology • Monitor dental health • Review food safety guidelines with moderate and severe immune suppression (to avoid food poisoning) 	<p><i>All of the interventions listed in Category N and A plus these for specific symptoms:</i></p> <p><u>Energy</u></p> <ul style="list-style-type: none"> • Increased energy needs • Increase calories with weight loss • Evaluation for oral supplements; may have to use elemental product and /or products containing MCT oil <p><u>Iron deficiency anemia</u></p> <ul style="list-style-type: none"> • Consume high iron foods with Vitamin C sources • Review sources of dietary folic acid and Vitamin B12 • Use iron supplementation if needed <p><u>Diarrhea</u></p> <ul style="list-style-type: none"> • Determine origin • Check for disaccharide intolerance, usually lactose • Evaluate for malabsorption • Evaluate fiber sources • Prevent osmotic diarrhea • Reinforce food safety strategies to prevent food poisoning • Offer lactobacillus acidophilus via yogurt <p><u>Cardiomyopathy</u></p> <ul style="list-style-type: none"> • Increase selenium-containing foods such as beef, tuna fish and liver <p><u>Oral candida</u></p> <ul style="list-style-type: none"> • Use lukewarm non-spicy, non-acidic foods <p><u>Fever</u></p> <ul style="list-style-type: none"> • Increase calories (7% increase in BEE for every degree increase in temperature F) <p><u>Nephropathy</u></p> <ul style="list-style-type: none"> • May need occasional sodium and protein restrictions 	<p><i>All of the interventions listed in A and B plus these for specific symptoms:</i></p> <p><u>Encephalopathy</u></p> <ul style="list-style-type: none"> • Monitor feeding skills, may have to change texture and consistency of food with developmental deterioration • Modify eating techniques and utensils • Refer to occupational and physical therapy for feeding therapy <p><u>Wasting syndrome</u></p> <ul style="list-style-type: none"> • Use high calorie, high protein diet • Evaluate for malabsorption • Consider use of enteral or parenteral nutrition • Consider use of appetite stimulants or agents that increase lean body mass <p><u>Mycobacterium avium-intracellulare (MAI/MAC)</u></p> <ul style="list-style-type: none"> • Use small frequent meals • Prevent osmotic diarrhea • Consider use of appetite stimulants with anorexia

Adapted from Rothpletz-Puglia, P. (1997) Case reports of nutrition intervention strategies for children with HIV infection *Topics in Clinical Nutrition*. Vol. 12(4):69-77

Other indices of nutritional status should be monitored as indicated e.g. liver enzymes if the child is receiving hyperalimentation, and fecal fat, D-xylose and hydrogen breath tests, when a child has suspected malabsorption. Micronutrients may also be monitored regularly especially if deficiency is suspected. Lipid levels should also be monitored on a regular basis.

Assessment of medications is important because so many of the drugs have side effects, drug-nutrient interactions, and are more or less effective with certain foods. Medication management for children with HIV is difficult because a child may be on as many as 10 to 15 medications, some of which are taken two to three times per day. Many families have to plan their whole day around the child's medication regimen, as some need to be taken with food and others without food. Table 4 (page 6) provides a list of medications used specifically for HIV with guidelines for administration and side effects. A child may also receive other medications based on their individual symptoms and manifestations of the disease.

NUTRITION INTERVENTION

Nutrition intervention should begin as early as possible. The goals of intervention are to:

- enhance immune function
- improve growth velocity
- improve quality of life.

The primary objectives of preventive nutrition counseling include:

- 1) teaching proper hand washing and food and water safety/sanitation
- 2) increasing the variety of foods in the diet especially foods rich in antioxidants, vitamins, and minerals
- 3) adapting food-preparation techniques to maintain optimum nutrient content
- 4) optimizing food availability and minimizing waste
- 5) teaching heart healthy principles
- 6) promoting feeding development and
- 7) encouraging safe, fun, age-appropriate activity.

Nutrition intervention is required when a child fails to meet growth standards defined as:

- weight growth velocity <5% (using incremental growth charts as a supplement to NCHS growth charts)
- weight-for-height <90% of median (50%ile on the NCHS growth charts)
- downward crossing of one major growth percentile
- loss of >5% lean body mass.

CDC has defined wasting syndrome, an AIDS defining illness as

- 1) persistent weight loss of >10% baseline
- 2) downward crossing of two growth percentiles on the NCHS chart
- 3) <5% for weight-for-length/height on NCHS chart on two consecutive measurements 30 days apart PLUS
 - a) chronic diarrhea—at least two stools per day for > 30 days **or**
 - b) documented fever, intermittent or constant >30 days.

When a child fails to meet growth standards using the guidelines listed above then the RD can assist the family in identifying appropriate symptom based dietary intervention strategies (See Table 2). The RD should also:

- evaluate for malabsorption
- provide appropriate oral supplements if dietary modification does not produce weight gain (may have to consider an elemental formula and/or a formula with MCT)
- consider providing an appetite stimulant if the child has had appetite loss and has enough food available
- provide nasogastric or gastrostomy tube feeds if oral enteral feedings fail to produce weight gain
- utilize parenteral nutrition when all enteral approaches have failed or when a child has profound malabsorption.

Other treatments being evaluated for the use in children with HIV include growth hormone therapy for reversal of wasting syndrome, cytokine blockers, anabolics for increasing lean body mass, specialized infant formulas, antioxidant and amino acid preparations, and lipid lowering agents.

SUMMARY

Nutritional care of children with HIV infection is challenging because of the different manifestations of the virus in each child. Moreover, there are philosophical considerations such as supporting quality of life, and addressing psycho-social issues. Development of the nutritional care plan should be multi disciplinary and include the child and family's needs. Interventions should begin as early as possible in the disease process and strategies should be proactive and preventive. This article has reviewed the disease classifications and provided nutrition assessment and intervention guidelines based on clinical categories. The case studies are used to provide the reader with information about the range of problems that can be seen in individual children with HIV. The March/April issue will address in more detail the impact on families and home-care for children with HIV.

Table 3 – Various Criteria Used in the Evaluation of Wasting, Malnutrition and Stunting in Growth

Waterlow Criteria

Actual weight divided by Ideal Body Weight (IBW) for actual length

- >90%..... no wasting
- 80-90%..... mild wasting
- 70-80%..... moderate wasting
- <70%..... severe wasting

Gomez Criteria

Actual weight divided by ideal weight for age

- >90%..... not malnourished
- 75-90%..... mild malnutrition
- 60-74%..... moderate malnutrition
- <60..... severe malnutrition

Kanawati and McLaren Criteria

Actual height divided by ideal height for age

- >95%..... no stunting
- 90-95%..... mild stunting
- 85-89%..... moderate stunting
- <85%..... severe stunting

Table 4 - HIV Medications – Administration Guidelines for Optimal Effectiveness

This table lists medications specific to HIV. The method of administration is listed related to using food or no food to increase optimal effectiveness of the medication. Many children are on other medications non-specific to HIV such as antibiotics, reflux medications and pulmonary medications. The side effects and nutrient/food interactions for each of these medications must also be considered.

Medication	Method of administration
Zidovudine (Retrovir, AZT)	May be taken with food to decrease nausea. A high fat meal may decrease absorption.
Didanosine (Videx, DDI)	To be taken on an empty stomach. The tablets can be dissolved in a non-citrus juice, or water
Zalcitabine (Hivid, DDC) Stavudine (Zerit, D4T) Lamivudine (Epivir, 3TC) Nevirapine (Viramune) Delvirdine (Rescriptor)	May be taken with food or on an empty stomach
Indinavir (Crixivan)	Should be taken on an empty stomach, either one hour before or two hours after to increase absorption. Avoid grapefruit juice. Fluid intake should be increased to prevent kidney stones. If the child must eat, a light meal such as a bowl of cereal with reduced fat milk, or juice, or toast.
Nelfinavir (Viracept)	Should be taken with meals.
Ritonavir (Norvir)	Should be taken with meals. This comes in a liquid preparation that is more palatable when mixed with something such as chocolate syrup. Sometimes it helps if the child numbs the mouth before and after with a sourball or something like it.
Saquinavir (Invirase)	Should be taken with meals and within two hours of a high-fat meal.

Summary of Interventions: Lisa is a well-nourished 7 year-old as determined by her weight and height for age. Per a 24-hour recall, Lisa's diet at the beginning of the month was adequate in macro and micronutrients. Per 24 hour recall at the end of the month, Lisa's diet was insufficient in Vitamin A, Thiamin, Riboflavin, Pyridoxine, Vitamin D, Iron, Magnesium, Phosphorous, Zinc, and Chromium. This family of five spends an average of \$200.00 per month on groceries (not including toiletries). About 60% of the food budget was spent on red meat. The most notable difference in diet at the end of the month was the absence of fortified cereal.

Interventions included accompanying caretaker to the grocery store to work on food budgeting, facilitating a peer-led cooking discussion about plant-based and more economical protein sources, recommending a multivitamin with minerals, promoting dental health, encouraging a low cholesterol intake, and providing food safety information.

CASE STUDY #2 - KATHY

Age: 12 years 7 months old

Medical History: CDC C3 classification - wasting syndrome, history of: CNS lymphoma, pancreatitis, multiple episodes of line sepsis, hypothyroidism, hypo/hyperglycemia, growth hormone deficiency, electrolyte disturbances, neutropenia, dental caries, recurrent fevers and non functional antibodies

Immune Status and Viral Load: CD4 21%/277, 663 copies/ml

Medications: Synthroid, Zidovudine (AZT, Retrovir), Nelfinavir (Viracept), Dapsone, Synthroid, Prednisone, Acyclovir, Tylenol with Codeine

Anthropometrics: Wt 23.4kg, Ht 115cm. Both weight (Z-score -2.80) and height (Z-score -5.96) are significantly below the 5th percentile. Kathy is 74% of median for height or severe stunting per Kanawati and McLaren definition. Her weight is 52.9% of median or severely wasted per Gomez criteria. Kathy is about the size of the average seven and one half-year-old child for weight and six-year-old for height.

CASE STUDIES

CASE STUDY #1 - LISA

Age: 7 years 4 months old

Medical History: CDC Classification B1, reactive airway disease, history of recurrent otitis media and neutropenia

Immune Status and Viral Load: CD4 44%/1093, < 400 copies/ml

Medications: Ritonavir (Norvir), Stavudine (Zerit, d4T) Amoxicillin, Centrum, Proventil

Anthropometrics: 28.8kg., 127cm, Both wt-for-age, and ht-for-age are > 75th percentile

General Principles illustrated by case study: preventive nutrition guidance, micronutrient deficiency evaluation, food availability, dental health, use of multivitamin with minerals, peer education

General Principles Illustrated by Case Study: symptom management, water safety, body image issues, hyperalimentation, quality of life issues

Summary of Interventions: Kathy has been severely malnourished for most of her life. Until recently, Kathy's caretakers had refused enteral or parenteral feedings. At one point several years ago, Kathy's grandparents began to force-feed her, as a result Kathy started refusing all food. They did this because they had witnessed Kathy's mother waste prior to death. The primary intervention at this time was to focus on quality of life and help bring back the social value of eating.

Kathy also has lactose intolerance, chronic abdominal pain and chronic diarrhea. Recommendations were made for a lactose-reduced diet, (milk has 9-14 grams (g) lactose/cup, yogurt 11-15 g/cup, ice cream 9g/cup, cottage cheese 5-8g/cup, lactase treated milk \leq 3g/cup, cheese < 1 g/cup). Diarrhea management included decreasing insoluble fiber such as corn, dried fruits, raw vegetables and fruits, nuts, seeds, popcorn, wheat bran, and whole grain bread. Soluble fiber such as oatmeal, rice, pearled barley, beans, and peas were increased to help bulk up the stool.

Small, frequent meals were recommended due to diarrhea and abdominal pain. Fluids were given between meals for hydration. Water is either boiled or cryptosporidium free bottled water is purchased (see Reference list for information). An appetite stimulant, growth hormone therapy, and pancreatic enzymes were also tried over the course of several years. Many different oral supplements, ranging from intact to elemental, were tried but Kathy refused them.

Eventually, Kathy developed tetany due to hypocalcemia and vitamin D deficiency. Kathy then started hyperalimentation. Her current regimen is providing 42 kilocalories/kilogram (kcal/kg) of body weight (cannot tolerate more), and 1.8 g protein/kg, plus vitamins and minerals.

Kathy's weight Z-scores have improved (closer to zero), however, she is still severely malnourished. Her quality of life has improved and there is less pressure about oral intake.

Kathy still continues to eat small amounts by mouth for the social value, nutritional value, and because of the importance of oral food intake for maintenance of the gastrointestinal tract. Finally, Kathy has many social problems, one of which is poor body image and sensitivity to her short stature. Referrals have been made for psychosocial support services including a peer support group.

CASE STUDY #3 - KADIJAH

Age: 4 years

Medical History: C3, progressive encephalopathy, history of: recurrent oral candidiasis, candida dermatitis, neutropenia, GER, hepatomegaly, tachycardia, otitis media, thrombocytopenia and non functional antibodies

Immune Status and Viral Load: CD4 40%/2132, < 400 copies/ml

Medications: Stavudine, Lamivudine, Nelfinavir, TMP-SMX, Diazepam, Carnitine

Anthropometrics: anthropometrics at 25 months of age 9.8kg, 78cm, Both weight (Z-score -1.84) and height (Z-score -2.26) below the fifth percentile. Now at 4 years of age, 14.8kg (10 - 25th percentile), 96 cm, (10th percentile) with a weight/height at the 50th percentile.

General Principles Illustrated by case study: nutrition intervention with neurologic deterioration - positioning, food textures, oral/motor deficits and accommodations, consideration of gastrostomy feedings, reflux management, medication administration

Summary of Interventions: As an infant Kadijah grew fairly well. She had some reflux during infancy. This was managed with thickened feeds, positioning, and reflux medication.

Kadijah began to develop neurologic problems at 11 months. Kadijah's parents reported that sometimes it seemed as if Kadijah would forget what to do with the nipple on the bottle. At 12 months of age Kadijah was prescribed an intact, isotonic oral supplement and received intensive feeding therapy. Kadijah's parents were taught how to modify food textures and consistencies to adapt to Kadijah's neurologic status and abilities. Kadijah was put on carnitine supplements because of diagnosed deficiency and the association with neurologic disease.

Many recommendations had been made to start Kadijah on gastrostomy feedings due to poor growth velocity, muscle wasting, and limited oral/motor skills. However, Kadijah's neurologic status, viral load, and nutritional status improved with changes in the antiretroviral regimen. Kadijah was placed on nelfinavir, a protease inhibitor. Nelfinavir comes in a powder or tablet form. The powder is sweet and granular and can be mixed with food (non-citrus). Kadijah is orally sensitive and gagged on the granular powder form, so the parents crush the tablet (much less volume, and not granular) and mix it with food.

At four years of age, Kadijah's parents continue to provide soft and pureed foods and an oral supplement. Kadijah is nourished and has an undetectable viral load.

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Nutrition Focus

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RESOURCES:

National Hotlines

AIDS Clinical Trials Information Service
1-800-TRIALS-A
CDC National AIDS Hotline 1-800-342-AIDS
National Pediatric and Family HIV Resource Center (NPHRC) 1-800-362-0071

National Organizations

AIDS Nutrition Service Alliance assists HIV nutrition providers through technical assistance, advocacy, networking and resource sharing; coordinates the annual AIDS meal and nutrition provider's conference; and provides referrals for individuals seeking local resources. Contact: ANSA 1400 Eye

Street, NW, Ste 201, Washington, DC 20006: 202-785-3564.

e-mail: ANSAoffice@aol.com
www.aidsnutrition.org

National Association of People with AIDS

has programs for health, treatment, public policy, information and referral. Its speakers bureau can arrange for HIV-positive and affected educators to speak at engagements nationwide. Contact NAPWA, 1413, K St., NW, 7th floor, Washington, DC, 20005-3442; 202-898-0414; www.napwa.org

National Pediatric and Family HIV Resource Center UMDNJ

provides consultation, technical assistance and training for health care providers. It also explores public policy issues related to the care of HIV infected children. Contact NPHRC at UMDNJ, 30 Bergen St, ADMC#4, Newark NJ 07107; 973-972-0410 or 1-800-362-0071; www.pedhiv aids.org
www.fxbcenter.org
www.kidsconnect.org

International Bottled Water Association

provides information about sources of cryptosporidium free bottled water. Contact the International Bottled Water Association on the Internet at www.bottledwater.org for an updated list of crypto free bottled water.

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