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Case Study 34: HIV/AIDS

1) *How is HIV transmitted? Based on Mr. Long's history and physical, what risk factors for contracting HIV might he have had?*

a. HIV is spread by sexual contact with an infected person, by sharing needles and/or syringes (primarily for drug injection) with someone who is infected, or, less commonly (and now very rarely in countries where blood is screened for HIV antibodies), through transfusions of infected blood or blood clotting factors. In addition, babies born to HIV-infected women may become infected before or during birth or through breastfeeding after birth. In the health care setting, workers have been infected with HIV after being stuck with needles containing HIV-infected blood or, less frequently, after infected blood gets into a worker's open cut or a mucous membrane (for example, the eyes or inside of the nose).

b. Risk factors for contracting HIV :

Mr. Long stated that he had a blood transfusion at age 18. Testing of blood samples for HIV antibodies began in 1992 so it is doubtful that he contracted HIV from a blood transfusion at that time. (Presuming that the case study takes place in 2013, Mr Long would have had his surgery in 1999, so his donated blood would have been tested). Mr Long admits to having several sexual partners. It is not known if safe practices were observed. If they were not, this definitely could have been a risk factor. Mr Long also worked as a dialysis nurse. There are risk factors associated with this profession as well. Mr. Long could have come into contact with infected blood products or have been a victim of a needle stick.

i. From the Centers for Disease Control and Prevention

2) *The history and physical indicate that he is seropositive. What does that mean? The Western Blot and ELISA confirmed he was seropositive. Describe these tests.*

a. To be seropositive means 'having a positive serum reaction especially in a test for the presence of an antibody'. Mr. Long tested positive for the presence of antibodies against HIV. The Western Blot detects specific HIV proteins in a given sample. It uses gel electrophoresis to separate the proteins, which can then be identified using antibodies specific to those proteins. ELISA is an acronym for Enzyme-Linked ImmunoSorbent Assay. This processes

introduces an antibody tagged with an enzyme to a sample of blood. If the tagged antibody attaches to an antigen, a color change will result when a catalyst is introduced, indicating a positive result. If no color change occurs, the results are negative for the antigen being tested for.

i. Nelms, pg. 742

3) *Mr. Long says he learned he was HIV-positive four years ago. Why has he only now become symptomatic ?*

a. Mr. Long was in an asymptomatic phase of the infection. Asymptomatic HIV infection is phase in which the immune system in someone with HIV slowly deteriorates, but the person has no symptoms. How long this phase lasts depends on how quickly the HIV virus copies itself, and how the person's genes affects the way the body handles the virus. At the time of initial infection, the T cell count is still at normal levels, allowing for a normal immune response. However, the virus remains in the cells and continues to attack the t cells. Over time, the number of viable t -cells decreases and this leaves the body open to secondary infections. The amount of time before a person notices symptoms depends on how active the virus is in that particular person and how fast the virus multiples, infects, and then kills the cells of the immune system. The virus has taken four years to kill enough cells to show symptoms.

i. From Nelms pg. 742

4) *What is thrush and why might Mr. Long have this condition?*

a. Thrush is a yeast infection of the mucus membranes of the mouth and throat. Thrush occurs when a fungus called Candida overgrows in your mouth. A small amount of this fungus lives in your mouth most of the time. It is usually kept in check by your immune system and other germs that also normally live in your mouth. However, when your immune system is weak or when the other normal bacteria die, the fungus can overgrow. Mr. Long appears to be entering the symptomatic phase of the HIV infection. Candidiasis, or Thrush, is a common clinical manifestation of HIV. Mr. Long's immune system and normal body flora is no long able to keep the fungus in check

i. From Nelms pg. 739

5) *After this admission, Mr. Long was diagnosed with HIV infection, Stage 3 (AIDS). What information from his medical record confirms this diagnosis?*

a. Stage 3 AIDS is categorized by weight loss of >10% of body weight, persistent constitutional symptoms (fever, diarrhea), oral candidiasis or hairy leukoplakia, acute necrotizing ulcerative gingivitis or necrotizing ulcerative periodontitis, pulmonary tuberculosis, severe bacterial infections, unexplained anemia, neutropenia, and or thrombocytopenia for more than a month. Mr Long has lost 14 lbs which is nearly 10% of his usual body weight of 165. Although

he did not complain of diarrhea, the observed hyperactive bowel sounds could indicate it. The hematological results show low levels of lymphocytes as well as very low levels of T-cells. This would be due to the HIV virus destroying CD4 lymphocytes. Mr. Long has a TLC of 2.5%. The normal range is between 15-45. This was calculated by multiplying the WBC count of 8500 by the % of lymphocytes which was 3% (.03) and dividing it by 100.

The most obvious lab result is the dramatically increased number for HIV-1 RNA Quant. The desired value for this test is a cell count of less than 75. Mr. Long's number was 29,000. This number indicated a very high viral load present in his bloodstream. This number is inversely related to the extremely low T-Cell counts. AIDS is diagnosed when your CD4 cell count goes below 200. Mr. Long's CD4 count was 153. Even if your CD4 cell count is over 200, AIDS can be diagnosed if you have HIV and certain diseases such as tuberculosis or *Pneumocystis carinii* pneumonia (PCP).

i. Nelms pg. 744

ii. From the Centers for Disease Control and Prevention

6) *What are the common nutritional complications of HIV and AIDS?*

a. AIDS-related wasting syndrome (AWS) is the most common nutritional complication. The body is under constant stress, so cortisol is constantly released, which leads to a breakdown of body protein to provide energy for the inflamed cells. Other complications are opportunistic infections which can occur due to the weakened immune status of the patient and the nutritional management of the adverse effects of the drug regime. Increased viral load can lead to increased risk for malabsorption of nutrients as can nausea and vomiting caused by medication therapies. Anemias are common. Oral pain, dysphagia and xerostomia can lead to a reduction in food intake. Fever, fatigue, breathing difficulties and coughing may impair food intake. Catabolism can occur. Wasting is common. HAART (Highly Active AntiRetroviral Therapy) may also cause nutritional issues. Side effects of these medications are nausea, vomiting, taste change and anorexia. Another major nutritional complications associated with HIV and AIDS is malnutrition. Because of a weakened immune system, infections, and side-effects of treatment, patients may experience loss of appetite, diarrhea, nausea, vomiting, and mouth sores, which cause a patient to stop eating or lose any energy and nutrients they take in. Their nutrient metabolism changes, positive and negative acute-phase proteins are produced which affect macro- and micronutrient absorption, and some micronutrient and mineral levels decrease.

i. Nelms pg. 750

7) *Are there specific recommendations for energy, protein, vitamin and mineral intakes for someone with AIDS?*

a. Calculating energy and protein needs for this population is difficult because of other issues with wasting, obesity, HIV-associated lipodystrophy syndrome (changes to body shape and fat redistribution), and a lack of prediction equations. Some research suggests to increase resting energy expenditure by 10% in those who are asymptomatic and for those with a diagnosis of AIDS and an existing opportunistic infection, an increase of 20-50%. Nelms states that 'weight maintenance is the goal with additional kcal typically recommended if weight gain is desired and a mild restriction in kcal to achieve desired weight losses. Protein recommendations remain as for a healthy individual at .8g/kg for those who are asymptomatic, but for those with an OI (opportunistic infection), a 10% increase is recommended because of increased protein turnover. Fat amounts are based on standard AMDR, but can be further based on energy needs, cardiovascular risks, and inflammatory conditions. Carbohydrate need is based on energy needs and carbohydrate intolerance.

Many deficiencies in vitamin and mineral absorption occur with HIV and AIDS due to malabsorption, drug-nutrient interactions, altered metabolism, gut infection and altered gut barrier functioning. Vitamin A, zinc and selenium can be low during infection responses. Low levels of Vit A, B12 and zinc are associated with a faster disease progression. A higher intake of vitamin C and B are associated with increased CD4 counts and a slower disease progression. It is recommended that individuals take a supplement that provides 100 % of the DRI.

i. Nelms pg. 758

8) Evaluate the patient's anthropomorphic information

a) calculate % UBW and BMI

Mr. Long's usual weight was 165 pounds. His current weight is 151 pounds. This represents an almost 10% weight loss.

$$\text{BMI} = \text{wt (kg)} / \text{ht (m)}^2 = 68.6\text{kg} / 1.85\text{m}^2 = \mathbf{19.96 \text{ or } 20 \text{ kg/m}^2}$$

$$\% \text{UBW} = 68.6 \text{ kg} / 75\text{kg} \times 100 = \mathbf{91.5\% \text{ of UBW}}$$

b) compare the TSF to population standards. What does this comparison mean? Is this a viable comparison? Explain.

Mr. Long had a measured TSF of 7mm. Normal TSF measurement: 15.1 to 85 mm.

This puts him in the below average range for both arm muscle area and arm fat area. Mr. Long is below average and his measurement is so low that there is likely total body wasting. Because his measurement is so low, I think other tests should be used in addition. A skin fold test would help compare him to the rest of the population. In Mr. Long's case, this is not a valid comparison. This measurement tool was designed for a healthy population and as Mr. Long is not healthy, then the comparison cannot be made. A better comparison would be to take Mr. Long's TSF

repeatedly over a period of time. This would give you a better look at whether he was maintaining muscle mass and body fat or if he was losing both muscle mass and fat.

i. Nelms pg. 51

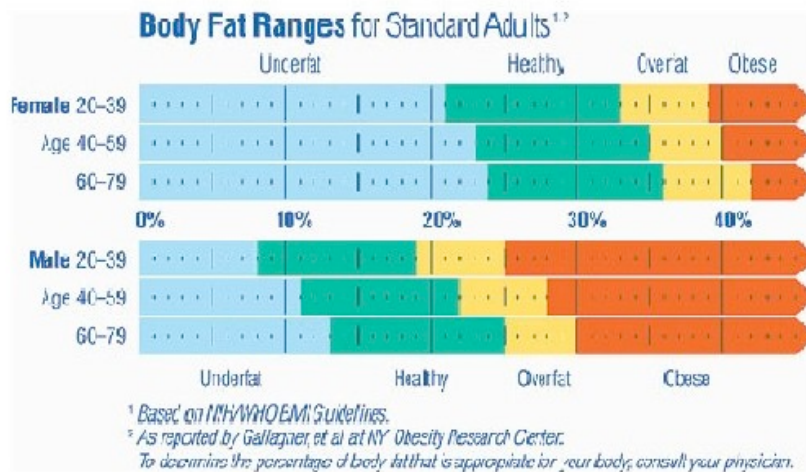
c. Using MAC and TSF, calculate upper arm muscle area. What can you infer from this calculation?

Mr. Long's TSF is 7mm. His MAC is 10". Both values converted to centimeters are TSF = 7 cm and MAC = 24.5 cm. AMA for males in mm² = $\frac{[MAC (cm) - (3.14 \times TSF \text{ in cm})]^2}{4 \times 3.14} - 10$

AMA (arm muscle area) is: $\frac{[25.4cm - (3.14 \times 7cm)]^2}{4 \times 3.14} - 10 = 538.28 - 10 = 42.85cm^2$. Adequate muscle mass for a man is at least 54. Mr. Long is only at **40.48 cm²**, which puts him in the marginal category. He is within 75%, so this measurement does not cause a lot of concern.

i. Nelms's pg. 50

d. Mr. Long's body fat percentage is 12.5%. What does this mean? Compare this to standards.



Mr. Long's body fat percentage is at the low end of the healthy range. If his malnutrition cannot be managed and his weight held stable, he will most likely fall into the underfat category.

9) Determine Mr. Long's energy and protein requirements.

a. Mr. Long is currently on disability, so a sedentary PA is being used.

$$\begin{aligned}
 \text{EER} &= [662 - (9.53 \times \text{age})] + \text{PA}[(15.91 \times \text{Wt}) + (539.6 \times \text{Ht})] \\
 &= 662 - 9.53 \times 32 + 1.00 (15.91 \times 68.6 + 539.6 \times 1.85) \\
 &= \mathbf{2452 (2400-2500) \text{ kcal/day}} \text{ for his current weight.}
 \end{aligned}$$

An additional 20-50% of calories per day may be added when an opportunistic infection is present, increasing the energy requirement to between 2942 kcal and 3678 per day (**2900-3700 kcals**). This increase in calories is also sufficient for him to gain weight.

Or, Using Mifflin. St. Jeor:

$$10 \times \text{wt (kg)} + 6.25 \times \text{ht (cm)} - 5 \times \text{age (yrs)} + 5$$

$$10 \times 68.64 + 6.25 \times 185.42 - 5 \times 32 + 5$$

$$686.4 + 1158.875 - 165 = \mathbf{1,680.275 \text{ kcals}}$$

$$\text{EER: } 662 - (9.53 \times 32) + 1.7(15.91 \times 68.64 + 539.6 \times 1.8542) = \mathbf{3,914.4 \text{ kcals}}$$

Protein requirements: .8g/kg x10% with the presence of an OI

$$= .8 (68.6) \times 10\%$$

= **59.48g** protein daily based on current weight. However, using 20% of his calorie goals to increase weight, .20 x 2900=580/4=**145 g**. protein or .20 x 3700=740/4=**185 g** protein.

i. Mahan pg. 24

10) Evaluate Mr. Long's dietary information. What tools could you use to evaluate his dietary intake?

a.Using the Exchange System:

Item	Calories	carb	fat	pro
cereal 2 cup	160	30	2	6
whole milk 1/2C	75	6	4	4
pork chop 2 @3oz	450	0	30	42
mashed potato 1C	160	30	5*	6
rice 1C	180	45	3	9
Soda x 2	240	60	0	0
Pizza 1 slice**	280	30	12	13
Candy (snack size)	80	15	8	0
cookies(choc chip)	80	15	10	0
beer x 2***	300	30	10	0
Totals	2005	261g	83g	80g

* assuming 1t butter per cup added

** assuming cheese 1 fat, 2 starch 1 med meat

*** 1 starch and 2 fat

$$261\text{g carb} \times 4\text{cal/g} = 1044 \text{ calories} / 2005 \text{ total calories} = 52\% \text{ of calories from carbs}$$

83g fat x 9 cal/g = 747 calories / 2005 total calories = 37% calories from fats
 80g pro x 4 cal/g = 320 calories / 2005 total calories = 15% calories from protein

Non nutritive calories (from soda and beer): 540 calories or 540/2005=26.9%

Since Mr. Long has an opportunistic infection, he needs between 2900 kcal to 3700 kcal per day. He is not consuming enough calories from food. Based on his average day recall, he is only consuming 2005 calories total with only 1465 calories coming from actual food products.

Based on his 24 hour recall:

Item	Calories	carb	fat	pro
apple juice*	180	45	0	0
pudding 1C**	250	30	12	6
rice and gravy**	250	30	12	6
ice tea with sugar*	180	45	0	0
<hr/>				
totals	860	150g	24g	12g

150g x 4 cal/g = 600 cal / 860 total cal = 70% of calories from carbs
 24g x 9 cal/g = 216 cal / 860 total cal = 25% of calories from fat
 12g x 4 cal/g = 48 cal / 860 total cal = 5%% of calories from protein

*estimating portions at 12 oz each

**estimating as 1 starch and 1 fat per 1/2 cup serving

To evaluate Mr. Long's diet, various tools could be used. The Exchange system was used to figure the above values, but other online tools like FitDay.com, MyFitnessPal.com and MyPlate.gov all have daily calorie/nutrient calculators.

11) Is Mr. Long consuming adequate amounts of food? Does his history indicate that he is having difficulty eating?

a. Mr. Long is not consuming adequate quantities of food. The diet history that he gave prior to the development of thrush contained an inadequate amount of calories (2005 kcal) and was a little too high in fat (37% fat). After the development of oral thrush and the resulting mouth sores, Mr. Long's intake contained an inadequate amount of calories (860 kcals) and protein (5%) with excessive carbohydrates (70%).

12) Mr. Long states that he consumes alcohol several times a week. Are there any contraindications for alcohol consumption for him?

a. Alcohol use can increase the susceptibility of an AIDS patient to certain complications, namely tuberculosis, pneumonia and viral Hepatitis C.

i. From the National Institute of Alcohol Abuse and Alcoholism

13. Using this patient's laboratory values, identify those labs used to monitor his disease status. What do these specifically measure, and how would you interpret them for him? Explain how the virus affects these laboratory values.

a. The laboratory values used to monitor Mr. Long's disease state of HIV are CD4+ (helper t-cells) and CD8+ (suppressor t-cells). Helper T cells divide rapidly at the beginning of the immune response, and regulate and assist in the immune response. Suppressor T cells are a component of the immune system that suppress immune responses of other cells, and shut off the body's cells involved in the immune response after they have done their job. Mr. Long has a CD4+ count of 153 mm³, a CD8+ count of 102 mm³, and a viral load count of 29,000 mm³. Both the CD4+ and the CD8+ are very low, while the viral load is very high. His lymphocyte % (produce antibodies) and monocyte % (remove debris from inflammation areas) are also out of normal range, again indicating impaired immune function. Additionally, WBC, RBC, and hemoglobin values can be used to monitor his disease state, as they measure functionality of the immune system and how well red blood cells are holding hemoglobin; most of these values except mean cell Hgb and transferrin are normal. To interpret this to Mr. Long, I would explain that these two values indicate how well the immune system is functioning, and the HIV virus is responsible for the destruction of these two cell types, explaining his abnormally low numbers. These values along with a viral load test can be used as an indication of the progression of HIV and can also be used to determine how successful treatment is. A person with HIV virus is said to have to have AIDS when they have a CD4 count below 200 cells/mm³. Mr. Long's count is 157 cells/mm³, revealing that he does in fact have AIDS.

i. Nelms's pg. 743

14. What laboratory values can be used to evaluate nutritional status? Do any of Mr. Long's values indicate nutritional risk?

a. Albumin, Prealbumin, and BUN can be used to evaluate Mr. Long's nutritional status. Albumin and pre-albumin are important for HIV patients because they require sufficient or higher levels of protein since it is needed to make, repair and maintain all the cells in your body. These two values are also indicative of how well the liver and kidneys are functioning. Albumin and pre-albumin are decreased in inflammation and malnutrition. Blood urine nitrogen and creatinine are important indicators of kidney function and hydration level (BUN). Mr. Long has a low prealbumin level of 15 mg/dL since a normal range is from 16 to 35 mg/dL, which can be indicative of nutritional risk for inadequate protein intake and could indicate impaired liver function. His albumin, creatinine, and BUN lab values are normal. His mean cell hemoglobin is high, which occurs in folate or vitamin b12 deficiencies, while his transferrin is decreased due to malnutrition. Mr. Long's HDL value is slightly low, but his LDL and total cholesterol are normal, showing he is not at nutritional risk for high cholesterol. His sodium, potassium, calcium, and other mineral levels are all normal, showing he is not at risk for mineral deficiencies. However, these values should be watched, as risk for electrolyte imbalance is always possible in HIV/AIDS patients.

i. Nelm's pg. 757

15. Mr. Long started on three medications that he will be discharged on. Identify these medications and the purpose of each.

a. Efarirenz-This is a non-nucleoside reverse transcriptase inhibitors that works to control the HIV infection by decreasing the amount of HIV in the blood and may decrease chance of developing AIDS and HIV-related illnesses like serious infections or cancer.

Tenofovir DF-This is a nucleoside reverse transcriptase inhibitor (NRTI). It helps to decrease the amount of HIV in the body by preventing HIV from replicating.

emtricitabine - This drug inhibits the enzyme that copies HIV RNA into new viral DNA. It can help to lower the amount of HIV in body and can increase CD4+ cells.

b.Efarirenz - may interact with products that contain kava or St. John's wort. It should not be taken with alcohol, as alcohol can worsen the side effects.Should be taken on empty stomach before going to sleep, as food and liquid can inhibit absorption.

Tenofovir DF-High fat meals increase bioavailability. Avoid alcohol, as it can worsen side effects.

Emtricitabine-No food restrictions. Avoid alcohol, as it can worsen side effects.

i. Nelm's pg. 745-746

16. Mr. Long is taking several vitamin and herbal supplements. What would you tell Mr. Long about these supplements? Do they pose any risk?

a.

Supplement	Use in HIV/AIDS Patients	Potential Risk
Vitamin C	Improves antioxidant capacity of body and immune system, increases iron absorption from non-heme sources	Increases urinary losses of oxalate and calcium.
Vitamin E	Have been associated with decreased risk of disease progression in those taking Antiretroviral medications.	At doses >1,000 mg it can interfere with clotting. Prolonged use of high does can cause nausea, diarrhea, muscle weakness, and fatigue.
Milk thistle	Can prevent liver damage caused by some HIV antiretroviral medications. May also help treat indigestion	Upset stomach, diarrhea, bloating, or increased flatulence may occur. Allergic reactions to milk thistle occur in individuals who are often allergic to ragweed

Supplement	Use in HIV/AIDS Patients	Potential Risk
Ginseng	Increase effects of some anti- depressants	Can cause diarrhea, insomnia, nervousness, depression, confusion, skin rashes, and high blood pressure
Echinacea	Anticancer, Immunostimulatory.	May inhibit metabolism of drugs using the cytochrome P 450 enzyme pathway
St. John's Wort	Antidepressant, anti- anxiety, anti-HIV uses ; contra-indicated with the use of medications like protease inhibitors and NNRTIs.	Reduced effectiveness of oral contraceptives and antagonistic to antihypertensive medications
Multivitamin	May slow disease progression. Increases CD4+ cell counts, lower viral load values. May delay the need for antiretroviral-drugs	None found

I. Nelm's pg. 749

17. *Select two high-priority nutrition problems and complete the PES statement.*

- a. 1. Unintentional weight loss (NC-3.2) related to HIV/AIDS, difficulty swallowing, and inadequate caloric intake as evidenced by BMI of 19.9 kg/m², 91%UBW, and recent weight loss.
2. Difficulty swallowing (NC-1.1) related to oral thrush as evidenced by patient's complaints and 24 hour diet recall.

18. *Identify three interventions you would recommend for modifying Mr. Long's tolerance of food until his oral thrush has subsided.*

1. Place him on a soft/liquid diet so that chewing and swallowing is easier
2. Use room temperature or cool foods which will irritate the thrush less than hot or spicy foods
3. Consume unsweetened yogurt with acidophilus or a probiotic to restore the balance of good and bad bacteria in the digestive system
4. Avoid high sugar or yeast containing foods that encourage yeast growth.

19. *Describe at least two areas of nutrition education that you would want to ensure that Mr. Long receives. Explain your rationale for these choices.*

- a. One area of nutrition education I would talk to Mr. Long about is food safety. I would give him a handout from the CDC as well as links to their website where he can find detailed

instructions about safe purchasing, food preparation and handling. This is important because he has a compromised immune system and has an increased risk of food borne illness.

Then, I would give him a chart with the medications and supplements he is on or may take, so that he would be aware of the drug nutrient interactions that can occur. I would list for him specific foods that he should/should not be consuming. This is important because his immune system is compromised, and the drugs he is on are very strong and could cause harmful effects if combined with the wrong foods or alcohol. I would also educate him on oral thrush and which foods he should or should not be eating to help lessen the severity of the condition by giving him a pamphlet of instructions. This is important piece of education because it is a current problem and discomfort he is facing that he surely wants resolved. Finally, I would give Mr. Long a list of his nutrition priorities (water/fluids, calories, protein, micronutrients) to assist with his weight maintenance and potential weight gain. I could provide him with a chart with each of these nutrition categories and their recommendations for patients with HIV/AIDS.

i. Nelm's pg. 761

20. Patients with AIDS are at increased risk for infection. What nutritional practices would you teach Mr. Long to help him prevent illness related to food or water intake?

a. Because of the compromised immune system of patients with HIV/AIDS, food safety is a top concern. Healthy people who develop food poisoning or infections from contaminated food and water are most often able to recover quickly and without severe health consequences. However, people with AIDS can become seriously ill from these infections and diseases. Additionally, food borne illness is much harder to treat in AIDS patients due to their compromised immune systems. When buying and preparing food and also traveling, an AIDS patient must be very careful about their food safety practices. I would instruct Mr. Long to:

- Wash hands thoroughly before and after preparing/eating food; also use hand sanitizer
- Cook all meats to a well done stage and do not consume raw meat or sushi at all
- Only use pasteurized dairy products
- Do not undercook eggs, only consume hard-boiled or hard scrambled eggs.
- Rinse fruits and vegetables thoroughly
- Do not eat any expired foods-check sell and use by dates carefully
- Do not drink waters from lakes, streams, rivers, or springs
- Ask for beverages without ice

21. Why is exercise important as a component of the nutritional care plan? What general recommendations could you give to Mr. Long regarding physical activity?

a. Exercise is a vital part of this nutritional care plan because it balances caloric intake and physical activity, improves muscle volume and function, and regulates lipid and energy metabolism. For patients with HIV/AIDS, exercise may lessen the loss of muscle mass in wasting conditions and can improve the recovery from protein wasting. For Mr. Long, therapy includes the combination of diet interventions and exercise. I would recommend an he being

exercise with both aerobic and resistance aspects at least three times a week. He could do light exercise like lifting multiple reps with light weights, and slowly jogging or cycling for a half hour. If three days a week or 30 minutes of aerobic activity is too much to begin with, Mr. Long can start gradually exercising, then being to work his way up as he gets stronger.

i. Nelm's pg. 760-761

22. One of the more recent complications for AIDS and prescribed HAART is the development of lipodystrophy. Define this condition and describe the most common signs and symptoms.

a. Lipodystrophy syndrome is an upset in lipid metabolism that involves the partial or total absence of fat and often time the abnormal deposition and distribution of fat in the body. While there are many types of lipodystrophy syndrome, one is related to some of the protease inhibitor drugs that are used to treat HIV/AIDS. This type of the syndrome involves the face, arms, and legs becoming thin due to loss of subcutaneous fat. The skin also becomes dry, weight loss occurs, and cracked lips often occur. Fat lost from the legs and arms is often redistributed to the back of the neck, breasts, abdomen and may not be able to be removed through exercise. Protruding veins, often mistaken as varicose veins, may also occur. Below average skinfold and abdominal circumference make this condition evident.

i. Nelm's pg. 753

23. How would the clinician monitor Mr. Long for the development of this disorder?

a. The clinician would monitor the development of lipodystrophy by conducting evaluations routinely after the appropriate interventions have been given to Mr. Long. A combination of diet and exercise is often first used to help altered fat metabolism or lipodystrophy syndrome. Once a diet plan and exercise program have been given to Mr. Long, he should be evaluated weekly to check for any change in his lipodystrophy. The evaluations would consist of various skin fold tests (abdominal, back, right side, infraorbital, buccal, and sub-mandible) and abdominal circumference tests. Solely checking his weight and BMI may not be efficient measures, because the fat is often redistributed, so these tests allow clinicians to monitor the abdominal fat deposition in order to differentiate between normal weight gains and deep tissue gains, to track changes in dorsocervical fat deposition, and to track peripheral fat losses in the facial areas.

i. Nelm's pg. 754, 760

Resources

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