HIV/AIDS

AIDS, AIDS, AIDS, AIDS
AIDS, AIDS

Mary White
NFSC 471
Outline

- HIV history
- Pathophysiology
- MNT/Nutritional Implications
- Case Study
- ADIME
History of HIV/AIDS

• 1980’s first awareness of AIDS (1)
  – Hypothesis that up to 300,000 infected in the 70’s unreported

• Discovered by increase in rare cases:
  – Cancers: Karposi’s Sarcoma
  – Pneumonia (PCP)

• Origins (2)
  – Monkeys hunted for meat in Africa

### Global summary of the HIV/AIDS epidemic, December 2008

#### Number of people living with HIV in 2008

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults</td>
<td>31.3 million</td>
<td>[29.2-33.7 million]</td>
</tr>
<tr>
<td>Women</td>
<td>15.7 million</td>
<td>[14.2-17.2 million]</td>
</tr>
<tr>
<td>Children under 15 years</td>
<td>2.1 million</td>
<td>[1.2-2.9 million]</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>33.4 million</td>
<td>[31.1-35.8 million]</td>
</tr>
</tbody>
</table>

#### People newly infected with HIV in 2008

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults</td>
<td>2.3 million</td>
<td>[2.0-2.5 million]</td>
</tr>
<tr>
<td>Children under 15 years</td>
<td>430,000</td>
<td>[240,000-610,000]</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2.7 million</td>
<td>[2.4-3.0 million]</td>
</tr>
</tbody>
</table>

#### AIDS deaths in 2008

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults</td>
<td>1.7 million</td>
<td>[1.4-2.1 million]</td>
</tr>
<tr>
<td>Children under 15 years</td>
<td>280,000</td>
<td>[150,000-410,000]</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2.0 million</td>
<td>[1.7-2.4 million]</td>
</tr>
</tbody>
</table>
A global view of HIV infection
39.5 million people [34.1-47.1] living with HIV in 2006

Adult prevalence rate
- <0.1%
- 0.1 - <0.5%
- 0.5 - <1.0%
- 1.0 - <5.0%
- 5.0 - <15.0%
- 15.0 - 34.0%
- Data not included

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: WHO / UNAIDS
Map Production: Public Health Mapping and GIS
Communicable Diseases (CDS)
World Health Organization

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AIDS Virus

• Retrovirus, contains RNA not DNA
• Contains 9 genes, 6 just for attaching and penetrating the host cell
• .1 microns in diameter
• T-cells 7 microns
• AIDS virus targets T-cells
  – CD4 Immune cells
  – GI cells
  – Others
Pathophysiology

- Virus found in blood and other bodily fluids

- Transmission:
  - Blood transfusions
  - Sharing needles
  - Sex: vaginal, anal, oral (rare)

- Viral dose must be sufficient for seroconversion
WHO Clinical stages of HIV/ AIDS

• **Primary HIV Infection**
  – Asymptomatic
  – Acute retroviral syndrome

• **Clinical Stage 1**
  – Asymptomatic
  – Persistent generalized lymphadenopathy

• **Clinical Stage 2**
  – Moderate unexplained weight loss
  – Recurrent respiratory infections
  – Herpes zoster
  – Recurrent oral ulceration
  – Fungal nail infections
  – Seborrheic dermatitis
  – Angular cheilitis
WHO continued

- Clinical Stage 3
  - Unexplained severe weight loss
  - Unexplained chronic diarrhea for >1 month
  - Unexplained persistent fever for >1 month
  - Persistent oral candidiasis (thrush)
  - Oral hairy leukoplakia
  - Pulmonary tuberculosis (current)
  - Severe presumed bacterial infections
  - Acute necrotizing ulcerative stomatitis, gingivitis, or periodontitis
  - Unexplained anemia (hemoglobin <8 g/dL)
  - Neutropenia (neutrophils <500 cells/µL)
  - Chronic thrombocytopenia (platelets <50,000 cells/µL)
WHO
continued

• **Clinical Stage 4**
  
  – HIV wasting syndrome
  
  – *Pneumocystis* pneumonia (PCP)
  
  – Chronic herpes simplex infection
  
  – Extrapulmonary tuberculosis
  
  – Kaposi sarcoma
  
  – Central nervous system toxoplasmosis
  
  – HIV encephalopathy
  
  – Disseminated nontuberculosis *Mycobacteria* infection
  
  – Candida of the trachea, bronchi, or lungs
  
  – Chronic cryptosporidiosis (with diarrhea)
  
  – Recurrent nontyphoidal *Salmonella* bacteremia
  
  – Symptomatic HIV-associated nephropathy
  
  – Symptomatic HIV-associated cardiomyopathy
### CDC classification system
#### HIV/ AIDS

<table>
<thead>
<tr>
<th>CD4 cell categories</th>
<th>Clinical categories</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Asymptomatic, Acute HIV, or PGL</td>
</tr>
<tr>
<td>(1) &gt;500 cells/ micro liter</td>
<td>A1</td>
</tr>
<tr>
<td>(2) 200-499 cells/ micro liter</td>
<td>A2</td>
</tr>
<tr>
<td>(3) &lt; 200 cell/ micro liter</td>
<td>A3</td>
</tr>
</tbody>
</table>
Progression to AIDS

- Either based on viral load or presence of specific opportunistic infection
- Secondary infections lead to malnutrition and increased mortality
Treatments

• Antiretroviral Therapy (ART)

• Highly Active Antiretroviral Therapy (HAART)
  – 2-3 types of drugs at once
  – Many cause side effects like N/V/D

• Treatments for Opportunistic infections
  – Antifungals
  – Antibiotics

• Traditional Medicine
  – Fake cures
  – Garlic

South Africa’s former health minister
Manto Tshabalala-Msimang
Nutrition implications

- AIDS virus attacks immune cells throughout the body
  - Diarrhea
  - Loss of micronutrients, electrolytes
  - Decreased absorption of Fat/ fat sol. Vit.
  - Inflammation
  - Increased energy needs 5-17% (EAL)

- Decreased intake to avoid discomfort
  - Malnutrition
  - Decreased immune function

http://www.adaevidencelibrary.com/topic.cfm?cat=3122
Nutrition Implications

- Opportunistic infections
  - Increased energy needs to fight infection
  - Increased medications, side effects

- Wasting/ Cachexia
  - Loss of 10% in 12 months
  - Loss of 6% in 6 months
  - #1 indicator of AIDS related mortality

CDC, HIV medicine
HIV

- Poor nutrition, weight loss, muscle wasting, weakness, nutrient deficiencies
- Impaired immune system, poor ability to fight HIV and other infections
- Increased vulnerability to infections, including HIV, increased morbidity and mortality
- Increased nutritional needs, reduced food intake, increased loss of nutrients

*Proceedings of the Nutrition Society (2008)*
MNT

• Main goal: to Ensure maintenance of healthy weight, Protein status, Micronutrient status.

• Combat wasting syndrome if present (HIV Medicine 2006)
  – Creating Diet plans that meet needs
  – Evaluating Energy needs

• Educate the patient on drug side effects, drug nutrient interactions, and contraindicated supplements (Current HIV Research, 2009)
Supplements

• Many supplements proclaimed to help HIV patients can also interfere with ART drugs.
  – St. Johns Wort (NNRTI)
  – Echinacea (NNRTI)

• Others like Multivitamins can be beneficial
HAART Interactions

• Marijuana
  – Increases serum levels of THC
  – No known overdose

• Alcohol
  – Videx (Didanosone) will increase risk of pancreatitis.
Case Study

• Patient: Terry Long
• Age: 32
• Sex: Male
• Education: Bachelor’s degree
• Household members: Father-69, Mother 66 both healthy
Case Study

• **Chief Complaint**: Fatigued all the time can’t work, Sore mouth and throat, lost a lot of weight, concerned he has progressed to AIDS and might have Pneumonia.
Case Study

Patient history

• Diagnosis of HIV 4 years ago
  – Confirmed by ELISA and western blot

• No treatment course to date

• Meds: Multivitamin, Vit. C, Vit. E, Ginseng,
  Milk Thistle, Echinacea, St. Johns wort.

• Family Hx: CHD, HTN-Father
Case Study

Medical Diagnosis/Treatment

• AIDS-Clinical category C2 with oral Thrush
• Fluconazole IV
  – Antifungal
  – D5 ½ NS@100cc/hr
• Haart regiment initiated with
  – Indivir
  – Stavudine (1)
  – Didanosine (2)
# Medication Information

<table>
<thead>
<tr>
<th>Drug</th>
<th>Class</th>
<th>Brand</th>
<th>Diet</th>
<th>D</th>
<th>N/V</th>
<th>Apetite loss</th>
<th>Taste change</th>
<th>Lipid alt.</th>
<th>Gluc. Intol.</th>
<th>Abdom. pain</th>
<th>Lipo-dystrophy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NRTI</td>
<td>Zerit</td>
<td>No</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>2</td>
<td>NRTI</td>
<td>Videx</td>
<td>Yes</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

1. Stavunine  
2. Didanosine- Take without food  
   - NRTI= Nucleotide Reverse transcriptase inhibiter
### Case Study

#### Patient’s supplements:

<table>
<thead>
<tr>
<th>Supplement</th>
<th>Dose/times taken</th>
<th>Nutrient interaction</th>
<th>Disease interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multivitamin</td>
<td>1/daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin E</td>
<td>1,500IU/ daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin C</td>
<td>500mg/ 4x daily</td>
<td>increases urinary losses of oxalate and calcium</td>
<td>Immune booster, antioxidant</td>
</tr>
<tr>
<td>Ginseng</td>
<td>500mg/ 2x daily</td>
<td></td>
<td>Proclaimed energy booster</td>
</tr>
</tbody>
</table>

Nelms text partial of Table 24.5, pgs746-747
# Case Study

## Patients supplements continued:

<table>
<thead>
<tr>
<th>Supplement</th>
<th>Dose</th>
<th>Interaction</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk Thistle</td>
<td>200mg/2x daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk Thistle</td>
<td>200mg/2x daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Echinacea</td>
<td>88.5mg/ 3x daily</td>
<td>may inhibit metabolism of drugs using the cytochrome P 450 enzyme pathway</td>
<td>Anticancer; immunostimulatory</td>
</tr>
<tr>
<td>St. Johns wort</td>
<td>300mg /daily</td>
<td>contraindicated with the use of medications processed by the CYP34A and P glycoprotein pathways including protease inhibitors and NNRTI's</td>
<td>Antidepressant, anti-HIV</td>
</tr>
</tbody>
</table>

Nelms text partial of Table 24.5, pgs746-747
Case Study
Nutrition Assessment

• Ht: 6’1”, Weight: 151

• IBW: 184, %IBW: 82

• UBW: 160-165, %UBW: 92

• Highest weight: 175 (over 10 years ago)

• BMI: 19.95
Case Study
Intake Assessment

• Usual Dietary intake:

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Total</th>
<th>recommended</th>
<th>% recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories</td>
<td>2822</td>
<td>3432</td>
<td>82%</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>102</td>
<td>128 (15%)</td>
<td>80%</td>
</tr>
<tr>
<td>Fat (g) total</td>
<td>90</td>
<td>78 (20%)</td>
<td>115%</td>
</tr>
<tr>
<td>Carbohydrates (g)</td>
<td>385</td>
<td>557 (65%)</td>
<td>69%</td>
</tr>
<tr>
<td>Sodium (mg)</td>
<td>4125</td>
<td>2400</td>
<td>172%</td>
</tr>
<tr>
<td>Vit. A (IU)</td>
<td>4593</td>
<td>5000</td>
<td>92%</td>
</tr>
<tr>
<td>Vit. C (mg)</td>
<td>2234</td>
<td>90</td>
<td>248%</td>
</tr>
<tr>
<td>Sat. Fat (g)</td>
<td>36</td>
<td>&lt;34</td>
<td>106%</td>
</tr>
<tr>
<td>Cholesterol (mg)</td>
<td>258</td>
<td>&lt;300</td>
<td>OK</td>
</tr>
</tbody>
</table>
### Case Study

**Intake Assessment**

- **24 Hour Recall**

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Total</th>
<th>Recommended</th>
<th>% recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories</td>
<td>960</td>
<td>3432</td>
<td>28%</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>15</td>
<td>128 (15%)</td>
<td>12%</td>
</tr>
<tr>
<td>Fat (g)</td>
<td>12</td>
<td>78 (20%)</td>
<td>15%</td>
</tr>
<tr>
<td>Carbohydrate (g)</td>
<td>189</td>
<td>557 (65%)</td>
<td>34%</td>
</tr>
<tr>
<td>Sodium (mg)</td>
<td>714</td>
<td>2400</td>
<td>30%</td>
</tr>
<tr>
<td>Vit. A (IU)</td>
<td>2700</td>
<td>5000</td>
<td>54%</td>
</tr>
<tr>
<td>Vit. C (mg)</td>
<td>200</td>
<td>200</td>
<td>100%</td>
</tr>
<tr>
<td>Sat. Fat (g)</td>
<td>5</td>
<td>&lt;34</td>
<td>OK</td>
</tr>
<tr>
<td>Cholesterol (mg)</td>
<td>2</td>
<td>&lt;300</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>
## Case Study
### Abnormal Lab values

<table>
<thead>
<tr>
<th>Lab</th>
<th>Patient</th>
<th>Normal Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albumin</td>
<td>3.6</td>
<td>3.4-5.0</td>
</tr>
<tr>
<td>Bilirubin</td>
<td>0.9 H</td>
<td>&gt;0.3</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>710 H</td>
<td>208-378</td>
</tr>
<tr>
<td>HDL</td>
<td>42 L</td>
<td>&gt;45</td>
</tr>
<tr>
<td>MCH</td>
<td>34.2 H</td>
<td>26-32</td>
</tr>
<tr>
<td>ESR</td>
<td>18</td>
<td>0-15</td>
</tr>
<tr>
<td>%Lymph</td>
<td>3 L</td>
<td>19.6-52.7</td>
</tr>
<tr>
<td>Monos</td>
<td>10</td>
<td>4-8</td>
</tr>
<tr>
<td>Viral load</td>
<td>29,000</td>
<td>0</td>
</tr>
<tr>
<td>T-cells</td>
<td>255 L</td>
<td>800-2,500</td>
</tr>
</tbody>
</table>
Case study
Problem List

• Inadequate energy intake (NI-1.4)
• Inadequate oral food/ beverage intake (NI-2.1)
• Evident protein energy malnutrition (NI-52.)
• Involuntary weight loss (NC-3.2)
• Food and nutrition related knowledge deficit (NB-1.1)
Case Study

Diagnosis

1. Evident protein energy malnutrition (NI-5.2) related to inadequate intake as evidenced by low prealbumin

2. Food and nutrition related knowledge deficit (NB-1.1) related to no previous treatment or nutrition education as evidenced by non-nutrient dense food choices
Case Study

Intervention 1

1. Meals and snacks (ND-1)
   a. Increase Caloric intake with supplements such as boost
   b. Encourage more nutrient dense food choices
   c. Create a soft diet until Oral Thrush heals
   d. Possibly initiate enteral nutrition if unable to reach energy goal.
Case Study
Intervention 1

• Goals:
  – Increase nutrient dense intake
  – Increase Protein stores
Case Study
Monitor/ Evaluation 1

• Food journal for
  – Caloric intake
  – Food choices

• Progression of Oral sores healing
  – Potential need for enteral nutrition

• Labs
  – Prealbumin (short term)
  – Albumin (long term)
Case Study
Intervention 2

2. Initial/ Brief Nutrition Education (E-1)
   – Weight management
   – Nutrient dense food choices
   – Meeting caloric needs of 3300kcals
   – Understanding of drugs effect on nutrient metabolism (lipid Profile)
Case Study
Intervention 2

• Goals
  – Pt demonstrates nutrient dense food choices
  – Pt stops losing weight
  – Pt meets energy needs
  – Pt demonstrates understanding of drug side effects and importance of following healthy food choices.
Case Study
Monitor/ Evaluation 2

• Labs
  – Lipids
  – Albumin
  – Prealbumin
• Weight
• Calorie intake
• Food journal
  – Food choices
Scope of practice

- Intervention 1: Meals and snacks (ND-1)

- Intervention 2: Initial/brief nutrition education (E-1)
Follow up

• Recommend monthly outpatient dietician visits at first then annually after patient demonstrates weight maintenance
• Monitor healing of oral thrush to progress diet
• Referral to psychologist for coping with side effects of drugs
References

- American Dietetic association Evidence analysis library
  - Nutrition and food safety
  - How do I get HIV or AIDS?
- Proceedings of the Nutrition Society (2008), 67, 109–113 [http://journals.cambridge.org/action/displayFulltext?type=1&fid=1681184&jid=PNS&volumeId=67&issueId=01&aid=1681176&bodyId=&membershipNumber=&societyETOCSession](http://journals.cambridge.org/action/displayFulltext?type=1&fid=1681184&jid=PNS&volumeId=67&issueId=01&aid=1681176&bodyId=&membershipNumber=&societyETOCSession)
- International AIDS vaccine initiative 2010 [http://www.iavi.org/Pages/home.aspx](http://www.iavi.org/Pages/home.aspx)
  - Recent progress on the path to an AIDS vaccine
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• Bruce Polsky MD, et al. Treatment Guidelines for HIV-Associated Wasting HIV CLINICAL TRIALS 5/1 JAN-FEB 2004

• National women’s health information center “HIV wasting syndrome” http://www.womenshealth.gov/hiv/livingwith/ois/ws.cfm

• Mark Kinzly & Nabarun Dasgupta, Doug Bruce, MA MD. Yale School of Epidemiology and Public Health, Yale AIDS Program Anti-HIV Medications + Street Drugs www.harmreduction.org/.../HIV%20meds_street%20drugs-M.KinzlyMar06.ppt