Models of Care for an Aging Population Living with HIV

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Objectives

• Understand the worldwide demographic trends of the aging population living with HIV
• Describe common comorbidities and aging syndromes prevalent in the aging HIV population
• Compare appropriate care models for an aging HIV population
• Examine care provider roles for individuals aging with HIV
Population with HIV is Aging Worldwide

Estimated percentage of the adult population living with HIV age 50 years and over, by region, 2012.

- 10% of the adult population with HIV in low- and middle-income countries are ≥50 yrs
- 30% of the adult population with HIV in high income countries are ≥50 yrs
- Since ~2007, the proportion of adults living with HIV ≥50 yrs has increased in all regions, and especially in high income countries where treatment is readily available

Source: UNAIDS.
In the US ~50% of people with HIV are over the age of 50.
Survival is Increasing for Individuals with HIV

Danish HIV Cohort
Study:
5,701 persons with HIV
28,505 matched controls
60,270 PY of observation for PLHIV

Median life expectancy for individual with HIV at age 25, without HCV, on ART

Danish HIV Cohort Study:
5,701 persons with HIV
28,505 matched controls
60,270 PY of observation for PLHIV

Adapted from Lohse, N & Obel, N. Annals of Int Med. 2016;165:749-750
Factors Behind the Trend

• Introduction of effective combination antiretroviral therapy (ART) approximately 20 years ago
• Morbidity and mortality related to opportunistic infections and other AIDS-related conditions has decreased
• New infections among persons older than 50
  o In 2013 17% of new HIV infections were among people over 50

Relationship of Comorbidities and Aging Syndromes in HIV
Trends in Comorbid Conditions

Commercial Insurance

Medicaid

Medicare

Meyer N et al. ICAAC/ICC. 2015, San Diego, CA
Increased Burden of Comorbidities

Age associated comorbidities included: hypertension, myocardial infarction, peripheral arterial disease, stroke, angina, type 2 diabetes, COPD, chronic kidney disease, non-AIDS cancer, fracture/osteoporosis.

Schouten J et al. CID. 2014; 59(12): 1787-97
Rate of Progression eGFR

31,000 veterans, progression to eGFR < 45

5 years of follow-up
Adjusted HR for DM+HIV = 4.45

No disease, 4%
DM
HIV-positive
DM + HIV, 18%

eGFR = estimated glomerular filtration rate (a marker of kidney function)
DM = diabetes mellitus

Medapalli, RK et al. JAIDS. 2012; 60: 393-399
Frequencies of Aging Related Syndromes

- Aging related syndromes are frailty or functional decline
- Aging related syndromes may be seen among HIV-infected adults before they are chronologically elderly

155 PLHIV, SF, CA
Median age= 57
83 participants (53.6%) w/ 2 or more geriatric syndromes
Predictors: No. of comorbidities and nadir CD4
Contributing Factors

HIV-infection: Replication, antiretroviral therapy, CD4 count/nadir CD4 count

Lifestyle (i.e. smoking, nutrition, exercise)
Host genetics

Inflammation, Immune Activation, Gut Microbial Translocation

Comorbidities: CVD, DM, mental health, bone, renal impairment, liver, malignancy

Age related syndromes: frailty or functional decline

Effros, RB. et al. CID. 2008; 4: 542-553
Decreased Quality of Life and Increased Disability

- HIV-infection: Replication, antiretroviral therapy, CD4 count/nadir CD4 count
- Lifestyle (i.e. smoking, nutrition, exercise)
- Host genetics
- Inflammation, Immune Activation, Gut Microbial Translocation
- Comorbidities: CVD, DM, mental health, bone, renal impairment, liver, malignancy
- Age related syndromes: frailty or functional decline

↓Quality of life
↑Disability

Effros, RB. et al. CID. 2008; 4: 542-553
With Success Comes Challenge

• **Success**
  - Less toxic ART
  - Decreased pill number and frequency
  - Improved knowledge about when to start ART and goals of care

• **Challenge**
  - Increased comorbidity → multimorbidity
    - Comorbidities have separate treatment guidelines that don’t “talk” to each other, result can be fragmented care, polypharmacy etc.
  - Increased demand for subspecialist care
  - Multimorbidities may go unrecognized by HIV providers
  - No formal guidance on caring for the aging person with HIV
  - Increased demand for sub-specialist care
  - Increased polypharmacy
    - Increases risk for non-compliance and drug-drug interactions
  - Increased risk of functional decline and disability
  - Geriatric?

Think Long Term: Act Sooner Rather than Later

Ensure engagement in care to control HIV

Lifestyle modification when needed

Inflammation, Immune Activation, Gut Microbial Translocation

Early stage identification and management of comorbidities

Screen and intervene to prevent long-term disability

↑Quality of life
↓Disability
Care Models for the Aging Population with HIV
Past to Present Eras of HIV Care

1981-1991
Opportunistic infection era

- Crisis management
- Treatment of opportunistic infections
- Palliative care
- Primary care

1991-2001
Antiretroviral era

- Focus on viral pathogenesis
- Specialization and medicalization of HIV care (“HIV specialist”)

2001-present
Chronic disease era

- HIV disease management
- Primary care
- Identifying and managing co-morbidities
- Identifying and managing age-related syndromes

Adapted from Chu C. & Selwyn PA. J Urban Health. 2011; 88: 556-566
Models of Care for Aging Individuals with HIV

• Assessment within the HIV/AIDS dedicated treatment center or ID practice
• Integration into primary care clinic/community health center
• Referral to geriatrician
• Assessment in the home

Ideal model has geriatrician involved in some capacity

- PCP completes assessment
- Dedicated MD or NP completes assessment
- Geriatrician completes assessment
- PCP, geriatrician, and subspecialists complete assessment at 1 comprehensive visit
Models Need to Incorporate:

**Comprehensive Aging* Assessment**

• Basic activities of daily living
• Instrumental activities of daily living
• Frailty
• Nutritional status
• Social network and financial status
• Living situation and accessibility
• Cognitive assessment
• Medical comorbidities
• Medication appropriateness
• Advance directives

**Comprehensive Comorbidity Assessment**

• Cardiovascular Health
• Kidney Health
• Liver Health
• Bone Health
• Mental Health

*Term “aging” is preferred over “geriatric”

# May depend on local patient population
Goals

- Comprehensive coordinated care, capable of providing:
  - Primary care
  - Preventive care
  - Specialized support for aging HIV+ patients
- Should be practical, replicable, and adaptable
Development of a Designated HIV and Aging Care Program in Boston

• What do we need to know about taking care of people aging with HIV?
• What are successful models of care?
• What are components of successful aging?
• How do we help our patients avoid disease and disability and maintain high function?
Development of the Age Positively Program in Boston

Community Needs Assessment

Concept of Program

Provider Education

Patient Education

Pilot Program (current status)

Next Steps:
FEEDBACK
Focus groups with patients and providers

Patients
• How do you feel about aging?
• What would be helpful in this program?
• What local, regional, and national needs should be explored?

Providers
• What do staff want to learn?
• How should the clinic work?

General
• Age for consultation
• How will patients be referred
• What is the workflow of the program?
Goals of Care Model

• Develop practice-wide comorbidity screening, aging syndrome assessment, prevention and management approach

• Implementation through a dedicated Age Positively Program visit for all HIV-infected individuals age 50 or older within the MGH Infectious Disease Associates practice in the following areas:
  • Cardiovascular health, Bone health, Diabetes, Kidney health, Mental health, Nutrition, Aging Assessment

• Facilitate education and training in chronic diseases and geriatrics to providers and patients within the practice

• Establish linkages with agencies that work with older HIV-infected individuals to better meet the psychosocial needs of this growing population.
Age Positively Program Flow

**Team**
APP NP/MD, Nurse, Dietician, IT provider, Geriatrician, Neuro, Social Worker, Psychiatrist, Occupational Health

**Age Positively Program Visit**
- Collect Data Electronic Template and EMR
- Clinic Visit Screening Assessments
- Relay Findings/Needs to PCP

**Follow Up**
Team determines if further assessment is necessary or monitoring in clinic
Comorbidity Assessment

**General History**
- ART (current and previous), other current meds, supplements current and previous CD4/HIV VL, lifestyle (smoking, ETOH, illicit drugs, diet, exercise) BMI, BP, co-infections, FMH

**Cardiovascular Health**
- Cholesterol Panel
- ACC/AHA 10-year Risk ASCVD
- Blood pressure

**Liver**
- LFTs
- HCV ab if HCV neg, Hep A & B vaccines?

**DM**
- HgbA1c or Fasting glucose

**Bone Health**
- Assess risk for falls
- Vitamin D level
- FRAX/DEXA (men and women)

**Kidney Health**
- Urinalysis
- Serum creatinine/eGFR estimation

## Aging Specific Assessments

<table>
<thead>
<tr>
<th>Deepf iN Screenings</th>
<th>Screening Tool</th>
<th>Frequency of screening</th>
<th>Follow Up (if needed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>PHQ2 (if + GDS15)</td>
<td>Annual</td>
<td>If + to psych ID</td>
</tr>
<tr>
<td>Dementia</td>
<td>Mini-cog, if + MoCA</td>
<td>Annual</td>
<td>If + neuro</td>
</tr>
<tr>
<td>Dental</td>
<td>Oral exam</td>
<td>Q 6 months</td>
<td>Refer to dental clinic of choice</td>
</tr>
<tr>
<td>Eyes (vision)</td>
<td>Snellen/eye exam</td>
<td>Annual</td>
<td>MEEI or pt preference</td>
</tr>
<tr>
<td>Ears (hearing)</td>
<td>Whisper test</td>
<td>Annual</td>
<td>MEEI or pt preference</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>PA Questions</td>
<td>Annual</td>
<td>RN/PCP</td>
</tr>
<tr>
<td>Planning/Advance Directives</td>
<td>Check EMR</td>
<td>Annual</td>
<td>PCP</td>
</tr>
<tr>
<td>Functional Status</td>
<td>ADLs/IDLs</td>
<td>Annual</td>
<td>Social work</td>
</tr>
<tr>
<td>Frailty</td>
<td>Frailty Questionnaire</td>
<td>Annual</td>
<td>Physical therapy/nutrition/home health</td>
</tr>
<tr>
<td>Nutrition</td>
<td>24 hour recall</td>
<td>Annual</td>
<td>Nutrition</td>
</tr>
</tbody>
</table>

Additional Activities of Team (Planned)

• Patient education via evening/afternoon workshops
• Provider education via monthly provider meetings
Workflow to Attain

Physical Medicine/rehab
Neuro/Mental health
Gero Subspecialty MDs
Nutritionist/dietician
MD
Nurse/NP
Case manager
Patient
Huddle Team meeting

Workflow Diagram:
- Physical Medicine/rehab
- Neuro/Mental health
- Gero Subspecialty MDs
- Nutritionist/dietician
- MD
- Nurse/NP
- Case manager
- Patient
- Huddle Team meeting
Challenges of Current Model

• Staff
• 1 additional visit for patient
• Need to develop continuity plan
• Funding
  • UCSF has funded their program through local AIDS Walk
• Need for more evidence based tools
• Not just an assessment—intervention
• Geriatrician not integrated sufficiently into program
The number of comorbidities among people living with HIV is increasing.

Screening for, recognizing and treating comorbidities and age-related syndromes early is important to help people living with HIV age positively.

Unique care models are needed to effectively care for this aging population.

Opportunity for clinicians from varied backgrounds (nurses, PAs, nurse practitioners, case managers, MDs) to collaborate and develop care models for this population.
Useful Resources/Reading

• HIV-Age.org: http://hiv-age.org/clinical-recommendations/
• Golden Compass (UCSF program) https://hiv.ucsf.edu/care/aging.html
• Singh, HK. Et al. From One Syndrome to Many: Incorporating Geriatric Consultation into HIV Care. CID. 2017; 65: 501-506
• Brennan-Ing, M & DeMarco RF (eds.). HIV and Aging, 2017.
• AIDS, June 1st, 2017 31 (Suppl 2). Note: supplement on HIV and Aging
HIV and Diabetes
Why are We Talking About Diabetes?

• Very common in the general population and rapidly increasing prevalence in the US and internationally

• One of the leading causes of CVD, blindness, kidney disease, hospitalization

• Diabetes can be treated and its consequences avoided or delayed with diet, physical activity, medication and regular screening and treatment for complications

• Common in HIV-infected populations

WHO Factsheet, 2017
Diabetes in the Setting of HIV

• Prevalence ranges from 2-14% in HIV
  • Varies by composition of the cohort studied
  • How diabetes diagnosis is made
  • How risk factors are accounted for in the analysis

• Some studies show increased risk of diabetes in the setting of HIV while other studies show no independent effect

Pathogenesis of Diabetes in HIV

- Antiretroviral medications
  - Thymidine analogues and older PIs
- HIV Factors
  - Immune activation/inflammation
- Risk Factors
  - Body composition
  - HCV co-infection
  - Genetic factors: family history, race
  - Lifestyle factors: diet, physical activity
  - Concomitant medications: steroids, atypical antipsychotics, opiates, testosterone
Case

• 54 year old African American woman, HIV+ for 12 years with central adiposity
• Mild hypertension, normal lipids, + smoker
• Mother with history of diabetes
• BMI is in overweight category
• Fasting glucose is 110 mg/dL (confirmed with repeat testing)
• Hemoglobin A1c is 6.3%
ADA Definitions of Diabetes

1. Fasting plasma glucose ≥ 126mg/dL (confirmed with repeat testing)
2. Plasma glucose 2 hours after 75g oral glucose tolerance test ≥ 200mg/dL (confirmed with repeat testing)
3. Hemoglobin A1c % ≥ 6.5% (confirmed with repeat testing*)
4. Random plasma glucose ≥ 200mg/dL and symptoms of diabetes (polyuria, polydipsia, polyphagia, weight loss)

*HgbA1c underestimates glycemia in individuals with HIV, in HIV HgbA1c may be 1-0.5% lower difference related to a low grade hemolysis in HIV and may not be reliable in HIV
Diabetes Screening

• Fasting glucose
  • If 100-125 mg/dL consider 75g oral glucose tolerance test

• Timing of screening:
  • Prior to ART initiation, within 4-6 weeks after ART initiation and every 6-12 months thereafter
Next Steps: Guidelines Focus on Personalized Management

• Initial management
  • Lifestyle modification-goal is weight loss
    • Diet
      • Monitor carbohydrates, limit sugar-sweetened beverages, follow Mediterranean Diet, watch portion sizes
    • Exercise
      • 30 minutes of moderate-to-vigorous intensity aerobic exercise at least 5 days a week or 150 minutes per week
  • Switch ART regimens
    • Consider if a patient is on lopinavir/ritonavir or a thymidine analogue
    • Switching is of uncertain benefit

• Medication therapy
  • Metformin is first-line medication
    • Advantages: safety and efficacy data are well known, no hypoglycemia, no weight gain, low cost
    • Disadvantages: risk of lactic acidosis and caution when coadministering with dolutegravir
  • Second line
    • Sulfonylureas
    • Thiazolidinediones (TZDs)
    • Insulin
Case: How to Proceed

• 54 year old African American woman, HIV+ for 12 years with central adiposity
• Mild hypertension, normal lipids, + smoker
• Mother with history of diabetes
• BMI is in overweight category
• Fasting glucose is 110 mg/dL (confirmed with repeat testing)
• Hemoglobin A1c is 6.3% (remember HgbA1c% may be falsely low in HIV)

Try lifestyle interventions, goal is weight loss, refer to nutritionist, work with patient to identify reasonable exercise plan, recheck fasting plasma glucose in 6 months. Follow up to reinforce lifestyle measures.
References

• Online video by Todd Brown, MD
  https://www.prn.org/index.php/complications/article/managing_diabetes_in_hiv_infected_patients