Early Detection of Dementia & Steps for a Healthy Brain

Kamal Masaki, MD
Department of Geriatric Medicine
John A. Burns School of Medicine
University of Hawaii
Supported in part by a cooperative agreement No. 90AL0011-01-00 from the Administration on Aging, Administration for Community Living, U.S. Department of Health and Human Services. Grantees carrying out projects under government sponsorship are encouraged to express freely their findings and conclusions. Therefore, points of view or opinions do not necessarily represent official AoA, ACL, or DHHS policy. The grant was awarded to University of Hawaii Center on Aging for the Alzheimer's Disease Initiative: Specialized Supportive Services Program.
HADI Hawaiʻi Alzheimer’s Disease Initiative

A PROJECT OF THE UH CENTER ON AGING

www.hawaii.edu/aging/hadi
Alzheimer’s Disease is a Public Health Crisis!

- Estimated 5.2 million Americans living with AD
- AD is 6th leading cause of death across all ages
- 1 in 3 seniors dies with some type of dementia

www.alz.org/facts
Healthy Brain Aging

• To continue to have the ability to:
  o Think, reason and remember
  o Plan and carry out tasks
  o Live a purposeful life
  o Function normally and remain independent
  o Maintain social connectedness
  o Maintain a sense of identity

Healthy Brain Initiative: CDC and Alzheimer’s Association
Brain Health As You Age: NIH, CDC, Admin. for Community Living
Changes in the Aging Brain

- Certain parts of the brain shrink, especially the center responsible for memory.
- Slight decline in ability to learn new things and retrieve information (remembering names, finding words).
- Improve in other cognitive areas, such as vocabulary and problem-solving – “wisdom”
Maintaining Brain Health

Reducing risk factors for heart disease

Physical Activity

Social Activity

Mental Activity

Good Nutrition
Physical Activity and the Brain

• May reduce risk of diabetes, heart disease, stroke and depression

• May reduce falls

• May help improve connections between brain cells

• Learn safe ways to exercise regularly

• Check with your doctor
Mental Activity and the Brain

- Continue to perform mentally stimulating activities
- Read books, play games
- Learn new things, take classes
- Volunteer
- Not proven to prevent dementia (be mindful of unrealistic claims made)
Social Activity and the Brain

• Continue to remain socially engaged

• Associated with reduced risk for some health problems, including dementia and depression

• Join senior centers or other community organizations
Good Nutrition and the Brain

• Lots of fruits and vegetables, whole grains, lean protein

• Less sugar, salt, saturated fats

• Adequate liquids

• Some studies suggest that the Mediterranean diet may help reduce risk for dementia
Reduce Heart Disease Risk Factors

- Control high blood pressure
- Control diabetes
- Control high cholesterol
- Avoid obesity
- Stop smoking!
- Stay physically active
- Start in mid-life, don’t wait until old age!
Stages of Cognitive Function

Abnormal

Normal

Presymptomatic

Prodromal MCI

Dementia

Time

Cognitive performance

Function (Activities of Daily Living)
WHAT IS DEMENTIA?
Dementia – Common Myths

- Memory loss is the same as “senility” - an inevitable part of getting old
- Nothing can be done for dementia
- Most people don’t want to know if they have dementia
- These misconceptions contribute to under-recognition of dementia
Dementia – Facts

- Dementia is NOT normal aging, it represents several types of diseases
- Dementia is common, under-diagnosed, very expensive, and fatal
- Patients with dementia should have a thorough evaluation by a physician who is experienced with dementia
Dementia Definition

- Acquired deficits (not mental retardation)
- Deficit in memory
- Deficit in at least one other cognitive domain
- Affects social and occupational function
- Absence of delirium and major psychiatric disorders
Mild Cognitive Impairment (MCI)

- Subjective cognitive complaint (pt or proxy)
- Cognitive deficit on testing in at least 1 domain (memory, language, attention, executive function, visuospatial)
- Normal social & occupational function (ie. NO DEMENTIA)
- High risk of converting to AD
Epidemiology of Dementia

- 13% in age 65 + years, almost 50% in 85+
- Geometric increase in prevalence of disease (after age 60, doubles every 5 years)
- Long duration of disease
- Major cause of disability, primary reason for institutionalization
- Over $200 billion annually for care and over $200 billion for lost productivity
- Families bear the majority of cost
Prevalence Rates of Dementia

[Graph showing the increase in prevalence rates of dementia with age.]
CAUSES OF DEMENTIA
Not All Dementias Are Alzheimer’s Disease (AD)

60-80% Alzheimer’s Disease

Vascular Dementia

Lewy Body Dementia

Fronto-Temporal Lobe Dementias

Other Dementias
  • Metabolic
  • Drugs/toxic
  • Tumors
  • Depression
  • Infections
  • Parkinson’s

Some forms are reversible (treatable)
Dementia Sub-Types

- Alzheimer’s Disease
- Vascular Dementia
- Lewy Body Dementia
- Parkinson’s Disease
- Fronto-Temporal Dementias
- Other causes (possibly reversible)
Kuakini Honolulu Heart Program & Honolulu-Asia Aging Study

- HHP started in 1965 at Kuakini Medical Center
- 8,006 middle-aged Japanese-American men – study of heart disease and stroke
- HAAS began in 1991 in the HHP cohort in 3,734 men ages 71-93 years
- Purpose: to study cognitive function, dementia, disability and diseases of aging
- Serial exams over 50 years
Prevalence Rates of Dementia

**Dementia - Overall prevalence 9.3%**

**Dementia + MCI - Overall prevalence 13.0%**
Prevalence of Dementia Sub-Types

AD Component - Overall prevalence 4.2%
CVD Component - Overall prevalence 3.3%
Dementia – Reversible Causes

- Brain tumors
- Encephalitis/meningitis
- Normal Pressure Hydrocephalus
- Subdural hematoma
- Post-traumatic
Dementia – Reversible Causes

- Thyroid disease
- Vitamin deficiency (B12, folate)
- Toxic - alcohol, medications
- Depression
- Delirium (any acute illness)
Alzheimer’s Disease

- First described by Dr. Alzheimer in 1906 – “pre-senile dementia”
- Most common cause of dementia (2/3rds in Western countries)
- Short-term memory, orientation and problem-solving are affected early
- Behavior problems common
- Insidious onset, progressive course, usually slow
- Duration 2-25+ years, mean 8-10 years
Alzheimer Pathology

- **Neurochemical abnormalities:** Deficiency of acetyl choline and other neurotransmitters

- **Pathology:** β-amyloid plaques and neurofibrillary tangles

- **NEURON LOSS!**
### Risk Factors for AD

<table>
<thead>
<tr>
<th>Non-modifiable</th>
<th>Modifiable</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Age</td>
<td>- Cardiovascular risk factors</td>
</tr>
<tr>
<td>- Low education</td>
<td>- High blood pressure</td>
</tr>
<tr>
<td>- Genetic susceptibility (ApoE4)</td>
<td>- Diabetes</td>
</tr>
<tr>
<td>- Traumatic brain injury</td>
<td>- Dietary factors</td>
</tr>
<tr>
<td>- Family history of AD</td>
<td>- Heavy alcohol intake</td>
</tr>
<tr>
<td>- Family history of Down syndrome</td>
<td>- Depression</td>
</tr>
<tr>
<td></td>
<td>- Chronic Inflammation</td>
</tr>
</tbody>
</table>
Cross-Sectional Association
BP & Poor Cognition: Kuakini HAAS

Late-life high BP ‘protects’ against poor cognition
Longitudinal Association
BP & Poor Cognition: Kuakini HAAS

Mid-life high BP increases risk of poor cognition

*4.7 (never treated)
Mid-Life Systolic BP & Neuritic Plaques: Kuakini HAAS

Blood Pressure Categories

<table>
<thead>
<tr>
<th>Relative Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
</tr>
<tr>
<td>Normal</td>
</tr>
<tr>
<td>Borderline</td>
</tr>
<tr>
<td>High</td>
</tr>
</tbody>
</table>
Treatment Modifies Association of Mid-Life BP & AD: Kuakini HAAS
AD Potential Protective Factors

- Physical activity?
- Social activity?
- Mental activity?
Walking and 8-Year Incident Dementia

Relative Risk

Distance Walked (miles/day)

- <1/4: 1.93
- 1/4 to 1: 1.75
- 1 to 2: 1.33
- >2: 1
Social Engagement and Incident Dementia

Relative Risk

<table>
<thead>
<tr>
<th>Level</th>
<th>Risk Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>2.34</td>
</tr>
<tr>
<td>Medium-Low</td>
<td>1.98</td>
</tr>
<tr>
<td>Medium High</td>
<td>1.38</td>
</tr>
<tr>
<td>High</td>
<td>1</td>
</tr>
</tbody>
</table>

Test for trend $p < 0.001$
Genetic Testing for AD

**Late-onset (sporadic) AD**

- Family Hx slight risk factor
- Apolipoprotein E4
- Increases the likelihood of developing AD), but does not guarantee it will happen
- ApoE4 1 allele: 2-3 x risk
- ApoE4 2 alleles: 8-12 x risk
- Testing NOT recommended routinely

**Early-onset AD**

- Familial AD – very rare (<5%)
- Autosomal dominant genes
- 3 genes identified
- Role of Trisomy 21 (Down’s syndrome)
EARLY DETECTION IS IMPORTANT
Rationale for Early Detection

• Treatment of reversible causes
• Improve treatment of underlying conditions
• Reduce ineffective and expensive crisis-driven care
• Patient and family education
  o Advance directives and planning for healthcare
  o Financial planning
• Safety issues
• Connect to available community services
Kuakini HAAS - Caregiver Recognition of Memory Problems

- None
- Yes, possibly
- Yes, definitely
Kuakini HAAS – Referral for Evaluation of Memory Problems
Undiagnosed Dementia in Primary Care in Hawaii

Dementia Stages

- All: 67%
- Mild: 91%
- Moderate: 50%
- Severe: 0%

Dementia Stages
SYMPTOMS OF DEMENTIA
Dementia – The ABCs

- Activities of daily living
- Behavior
- Cognition & intellectual capacity
- Caregiver stress
- Disease progression is inevitable
- Educate patient and caregivers
Symptoms: Early Stage

- Short-term memory loss
- Disorientation (specially date)
- Naming difficulties
- May still have insight, may try to compensate
- Associated depression
Symptoms: Intermediate Stage

- Disoriented for date and place
- Comprehension problems, speech and naming problems, difficulty learning new tasks
- Behavior problems - suspicious, paranoid, personality changes
- Needs constant supervision
Symptoms: Late Stage

- May still have behavior problems, agitation, wandering
- Long-term memory gone
- Socially inappropriate
- Poor judgement
- Safety issues
DIAGNOSIS OF DEMENTIA
Dementia Diagnosis

- Complete history (patient and family)
- Medication and alcohol history
- Functional status, living situation
- Physical examination
- Memory testing (depends on previous function and education)
- Blood tests
- Brain CT or MRI scan
TREATMENT OF DEMENTIA
Treatment of Dementia

PRIMARY GOALS: to enhance quality of life and maximize function by improving or stabilizing cognition, mood and behavior

- Non-Pharmacologic
- Pharmacologic
- Management of Symptoms
Non-Pharmacologic Treatment

- Interdisciplinary team approach (MD, RN, MSW, psychologist, dietician, rehabilitation therapists, others)
- Regular medical appointments
- Environmental modification
- Legal planning – healthcare and financial
- Care for the caregiver – monitor burden, suggest respite care, support groups
- Education, Community Resources (AA)
Safety Issues in Dementia

• Medications – Over and under usage, over-the-counter medications

• Wandering – MedicAlert, register in AA Safe Return program

• Stove, Water

• Driving

• Risk for elder abuse and neglect

• Financial abuse, sweepstakes
Summary of Treatment Strategies

- Early diagnosis is key
- Treat the cause (if found)
- Treat complications (behavior, sleep)
- Safety, stable environment
- Family education, caregiver support
- Interdisciplinary team approach
- Community resources – AA, EOA
- Planning for future financial / legal issues
Dementia Goals of Care

- Improve quality of life
- Maintain functioning for as long as possible
- Avoid social isolation
- Care for the caregiver
Alzheimer’s Association- Aloha Chapter

• Leading source of information on dementia
• Caregiver classes, support groups, community presentations, professional trainings
• Care consultation – assistance with planning, provide counseling services
• MedicAlert + Safe Return® program – 24-hr. nationwide emergency response service
• TrialMatch®– Clinical trials matching service

Alzheimer’s Association, Aloha Chapter
Tel: (808) 591-2771   |  Fax: (808) 591-9071
www.alz.org/hawaii   1-800-272-3900
Healthy Brain Initiative Road Map


The Healthy Brain Initiative
The Public Health Road Map for State and National Partnerships, 2013–2018
Mahalo!

Questions?
Are AD Biomarkers a Game Changer?

modified from Aisen PS *Alzheimers Dement.* 2010
AD FDA-Approved Treatments

- **Cholinesterase Inhibitors:**
  - Donepezil (Aricept)
  - Rivastigmine (Exelon)
  - Galantamine (Reminyl / Razadyne)
  - No head to head studies on efficacy

- **NMDA-receptor antagonist:**
  - Memantine (Namenda)

- Temporary stabilization or slowed decline represent treatment success, patient and family education is key

- Possible reduction in behavioral disturbances

- Possible delay of nursing home placement (mixed results of studies)
Alzheimer Pathology

- **Neurochemical abnormalities:** Deficiency of acetyl choline and other neurotransmitters

- **Pathology:** β-amyloid plaques and neurofibrillary tangles

- **NEURON LOSS!**
AD – Treatments that have failed

- MAOIs (Selegiline)
- Antioxidants (Vitamin E, Ginkgo Biloba)
- Chelating agents (aluminum theory)
- Ergot alkaloids (Hydergine)
- Estrogens
- Anti-Inflammatory hypothesis:
  - NSAIDss, COX-2 inhibitors
  - Prednisonone